

# KIC 006591775

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006591775-01	OBS	No	337.761849	289.009338	911.5	11.527	13.3	6.7	0.80	5415	2.50	0.68
006591775-02	OBS	No	583.869722	406.311297	932.9	10.733	12.0	6.8	0.80	5415	2.52	0.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006591775-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
006591775-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

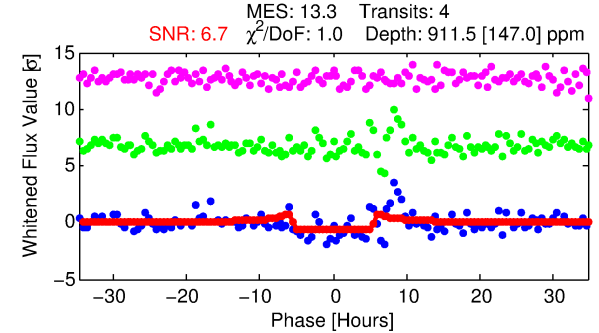
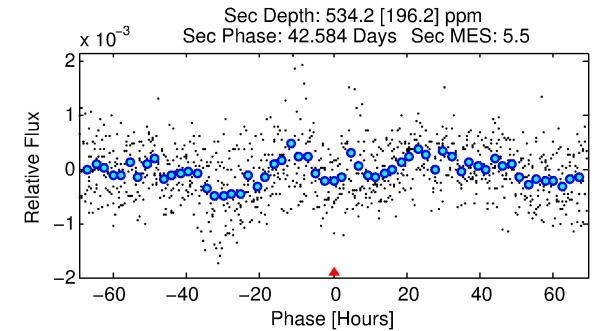
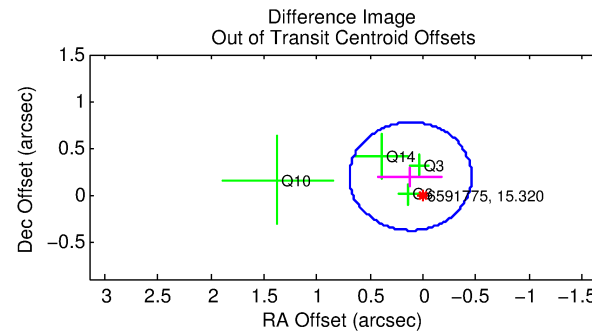
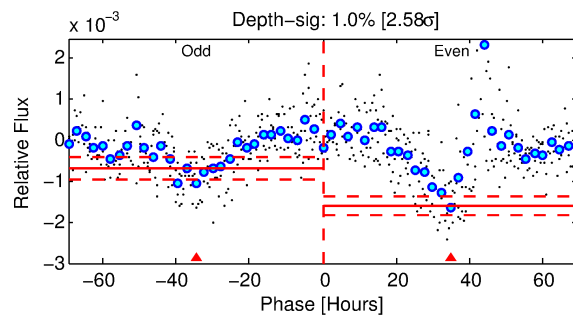
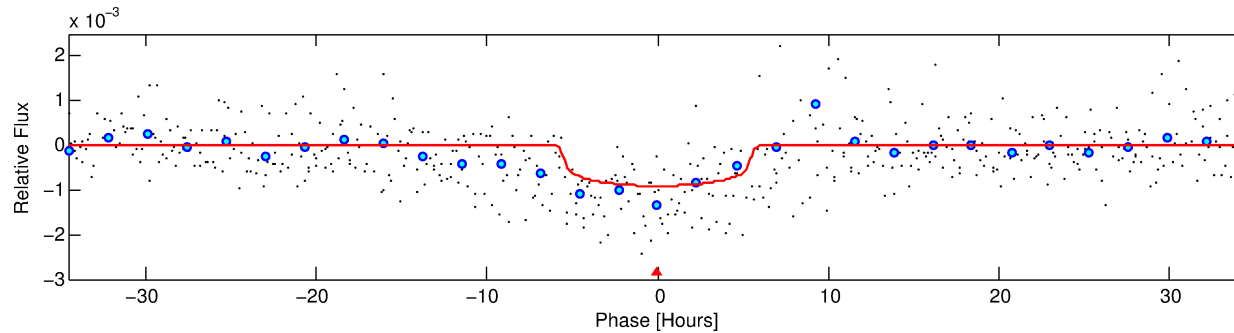
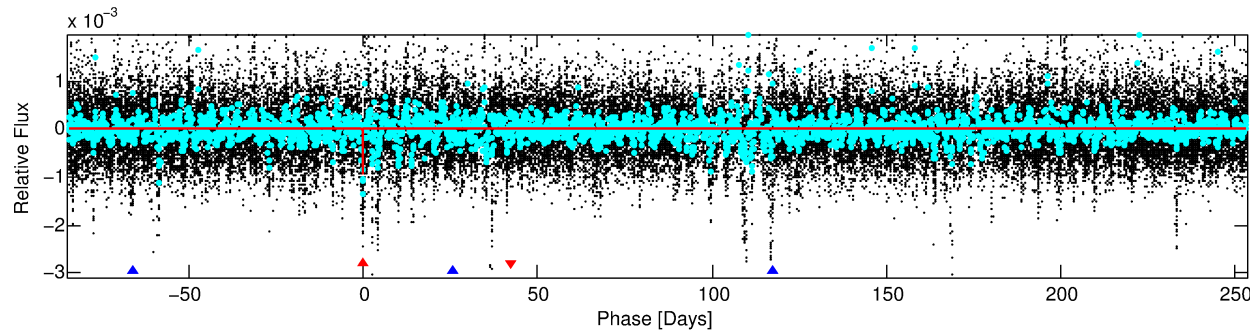
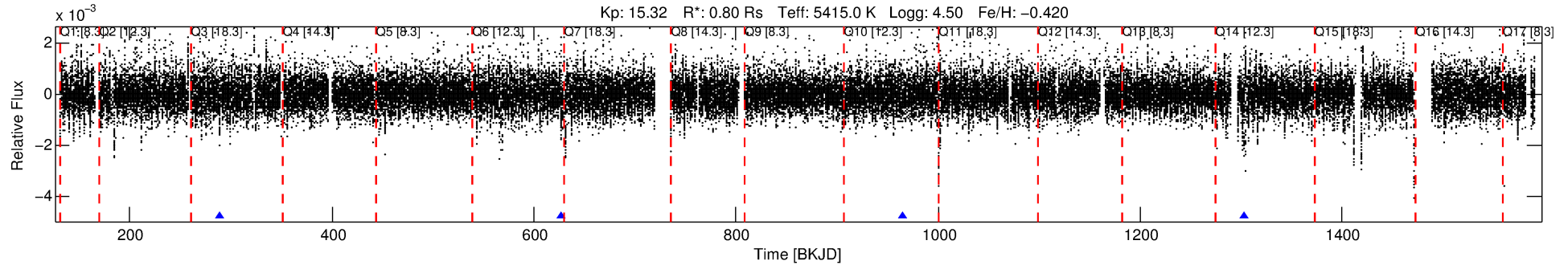
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006591775-01

No Significant Match Found

# DV One-Page Summary

KIC: 6591775 Candidate: 1 of 2 Period: 337.762 d



## DV Fit Results:

Period = 337.76185 [0.00685] d  
Epoch = 289.0093 [0.0137] BKJD  
Rp/R\* = 0.0286 [0.0115]  
a/R\* = 191.54 [309.82]  
b = 0.57 [1.92]  
Seff = 0.67 [0.16]  
Teq = 231 [14] K  
Rp = 2.50 [1.08] Re  
a = 0.8568 [0.1120] AU  
Ag = 34551.80 [31415.64] [1.10 $\sigma$ ]  
Teffp = 4872 [1093] K [4.25 $\sigma$ ]

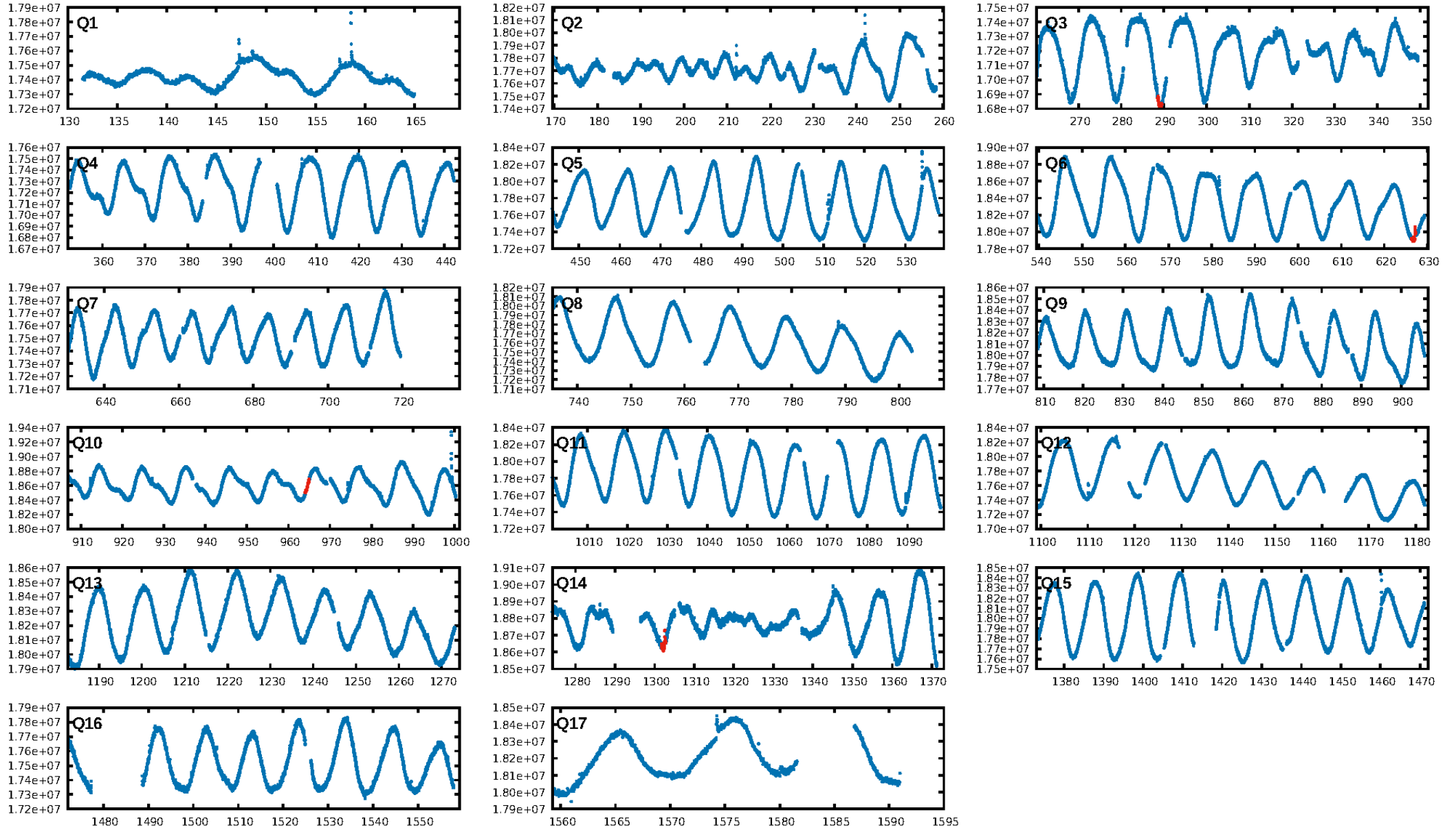
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [375.02 $\sigma$ ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 92.2%  
Bootstrap-pfa: 1.49e-16  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.111  
Centroid-sig: 8.8%  
Centroid-so: 1.232 arcsec [1.28 $\sigma$ ]  
OotOffset-rm: 0.229 arcsec [1.19 $\sigma$ ]  
KicOffset-rm: 0.138 arcsec [0.58 $\sigma$ ]  
OotOffset-st: 3/1/0/0 [4]  
KicOffset-st: 3/1/0/0 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 1.00 [4/4]

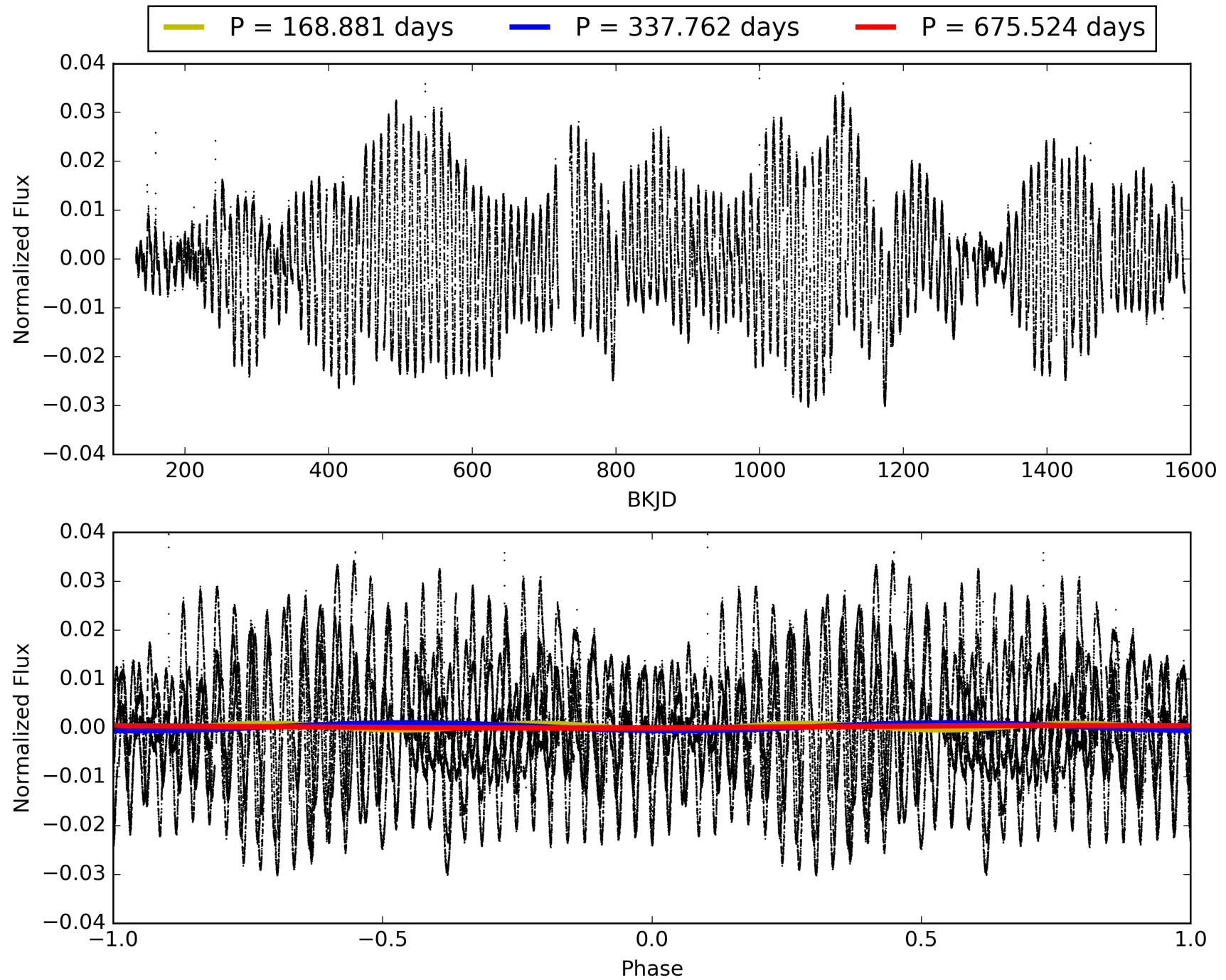
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:53:00 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006591775-01, PDC Light Curves

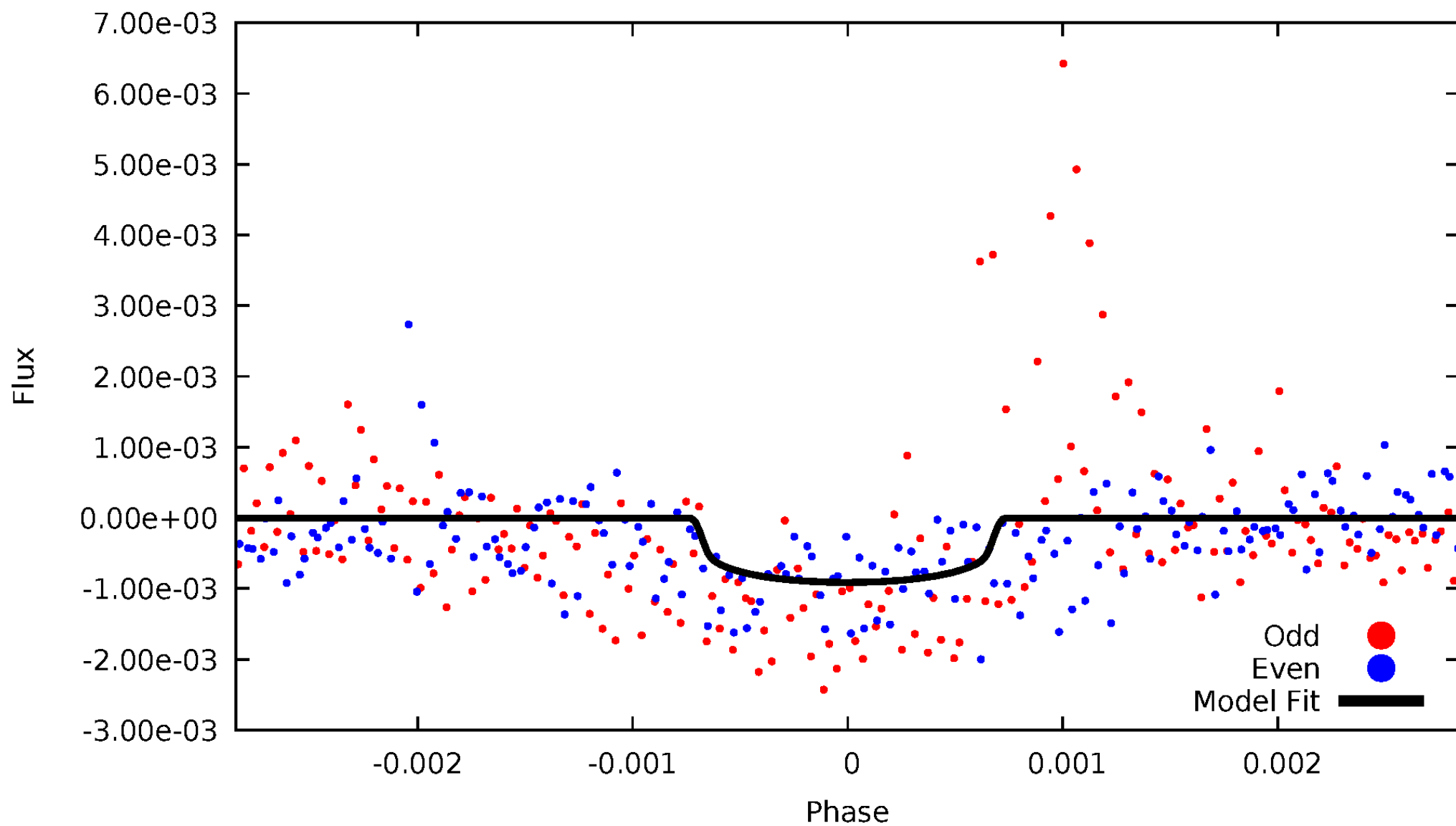


TCE 006591775-01



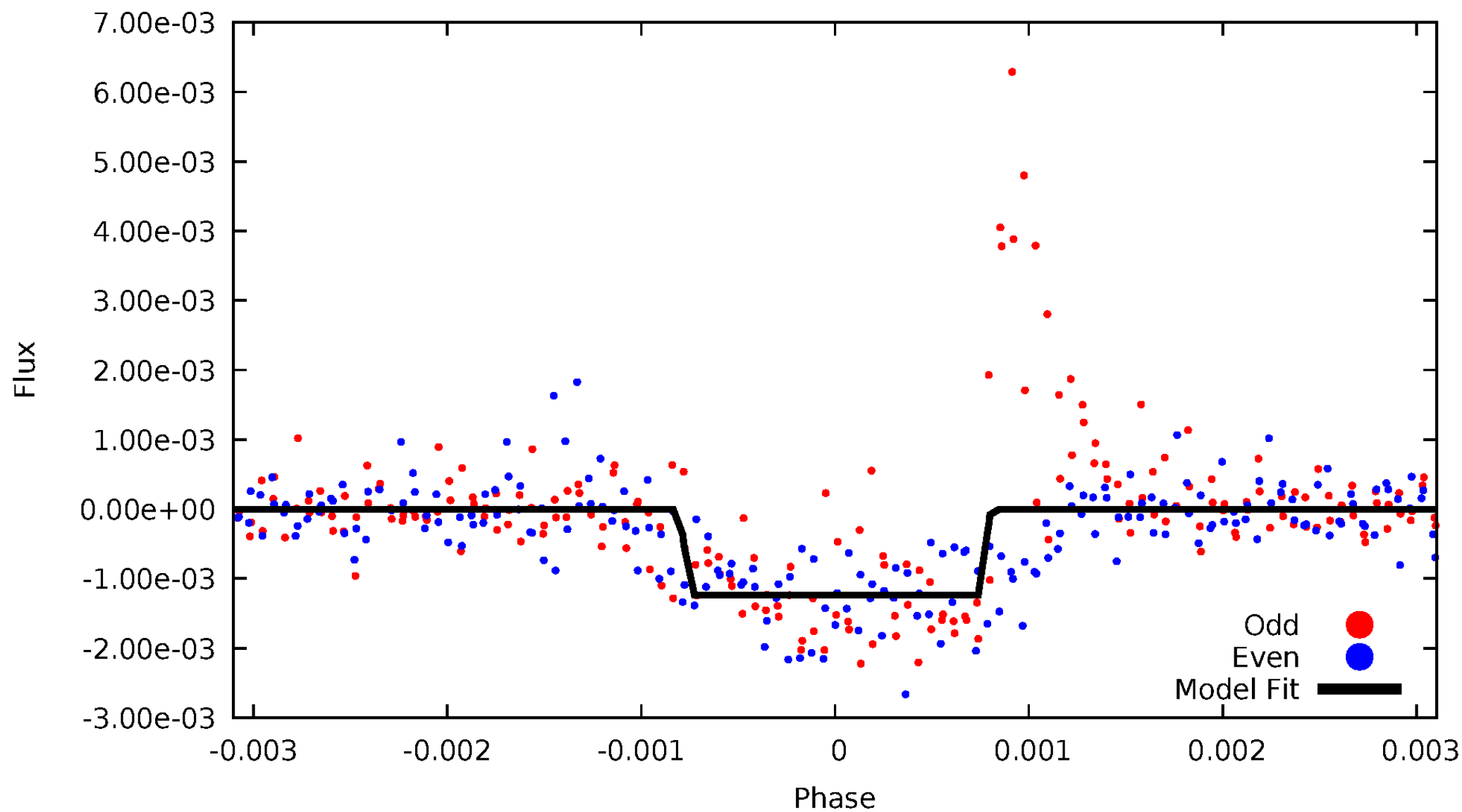
# DV Odd/Even

TCE 006591775-01



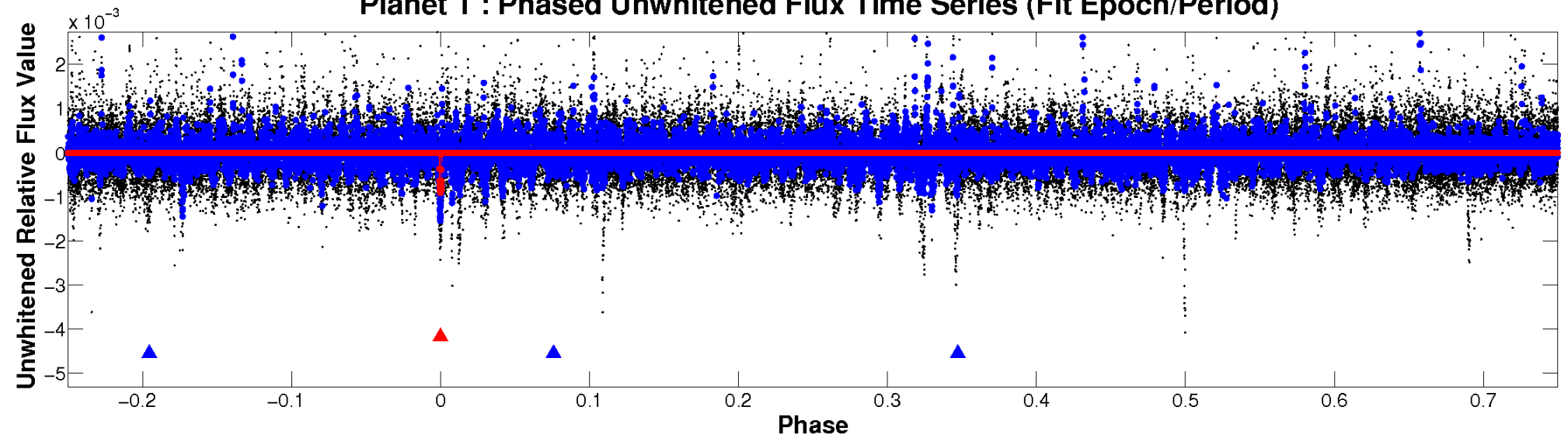
# ALT Odd/Even

TCE 006591775-01

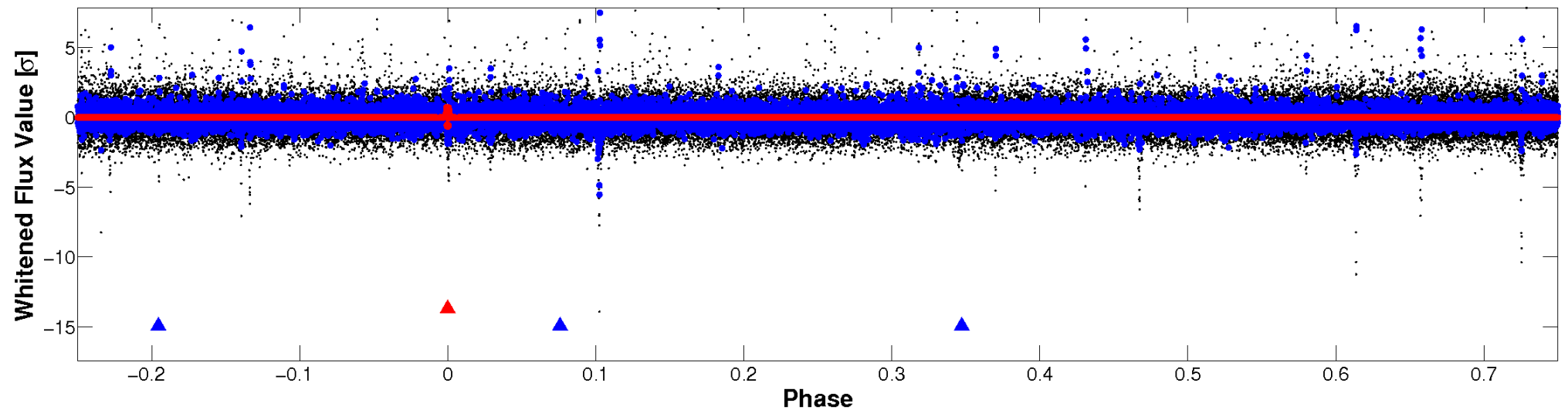


# Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

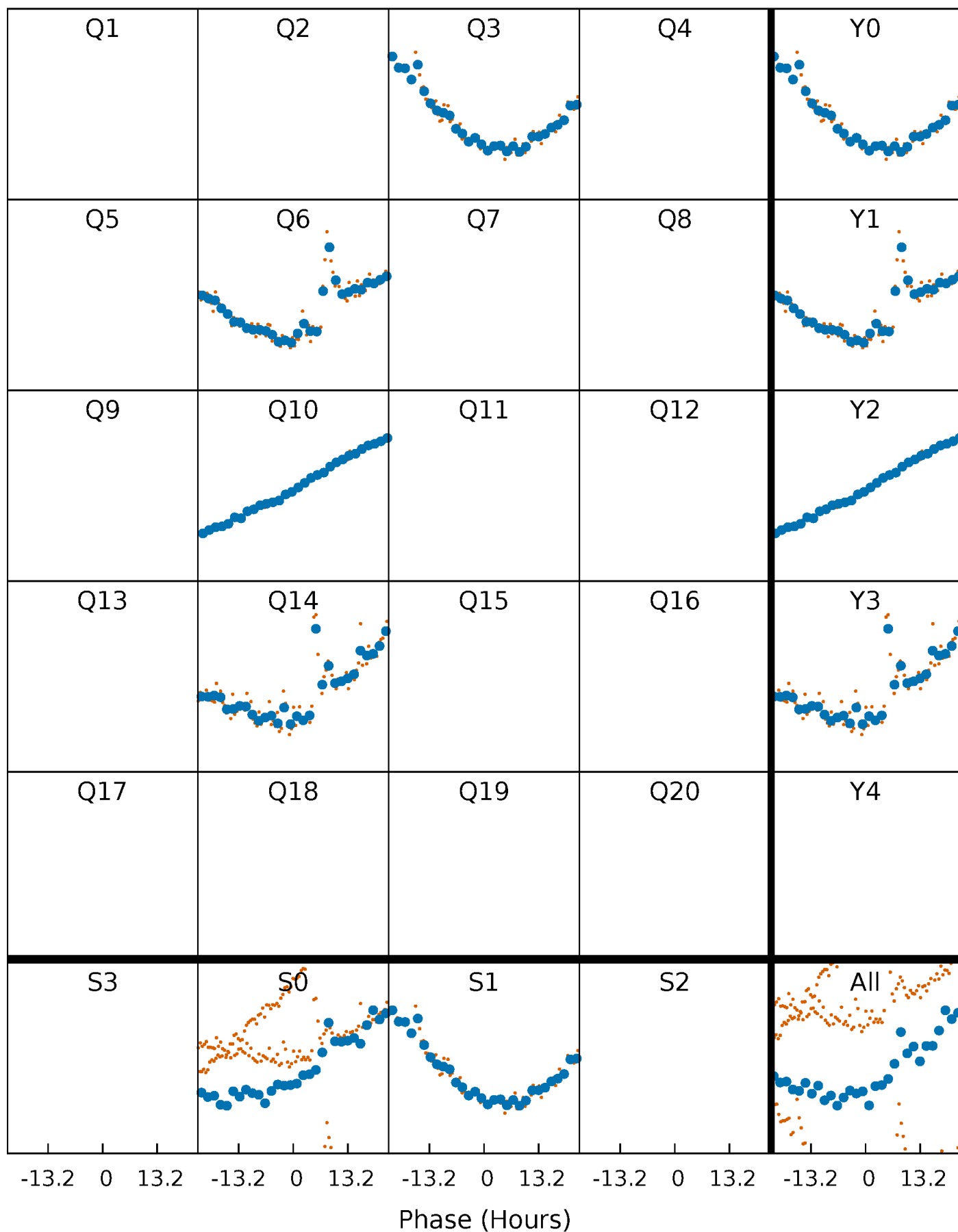


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

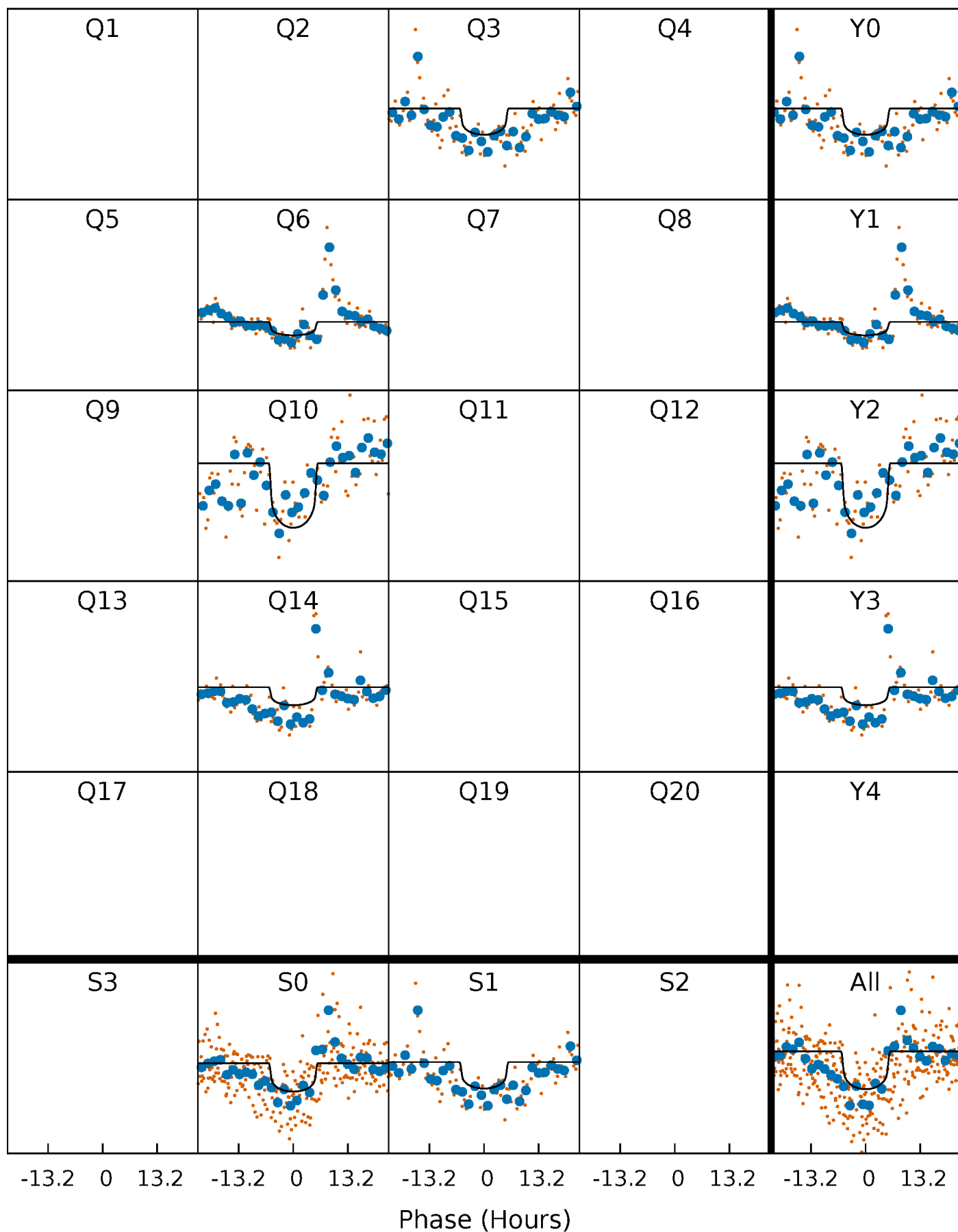
TCE 006591775-01 P=337.761849 Days  $T_0=289.009338$  (BKJD)





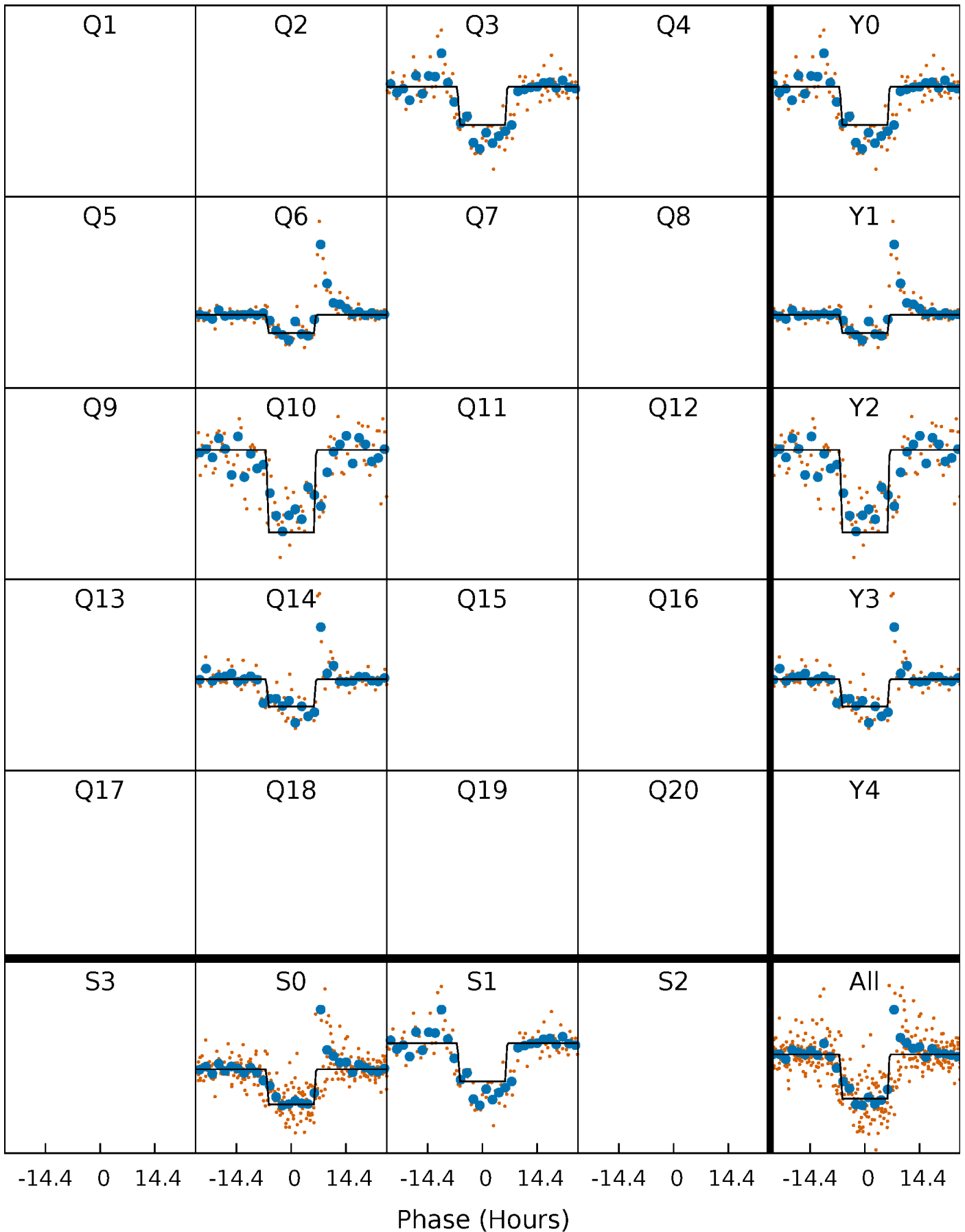
# DV Quarter-Phased Transit Curves

TCE 006591775-01 P=337.761849 Days  $T_0=289.009338$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

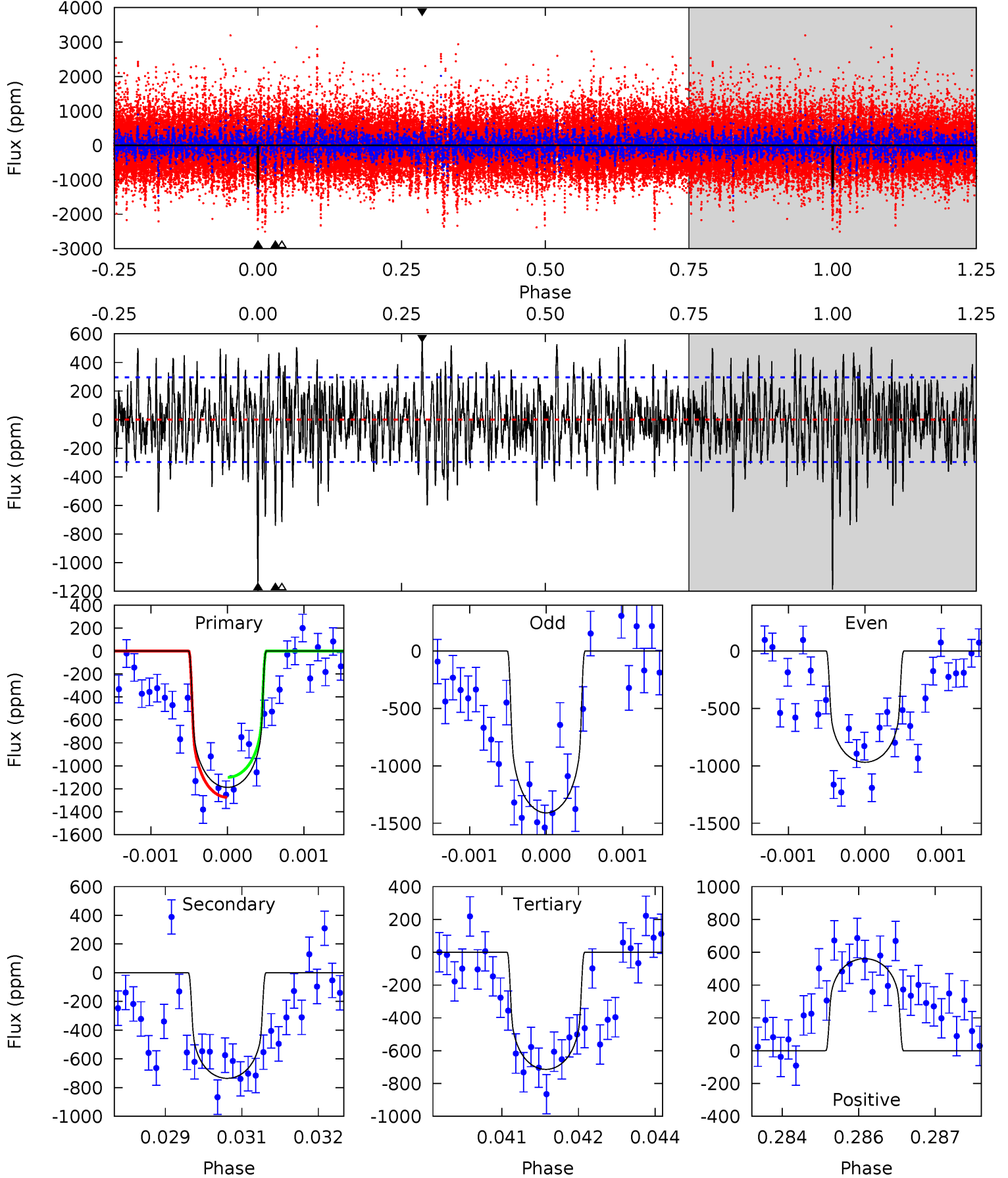
TCE 006591775-01 P=337.705446 Days  $T_0=289.095888$  (BKJD)



# DV Model-Shift Uniqueness Test

006591775-01, P = 337.761849 Days, E = 289.009338 Days

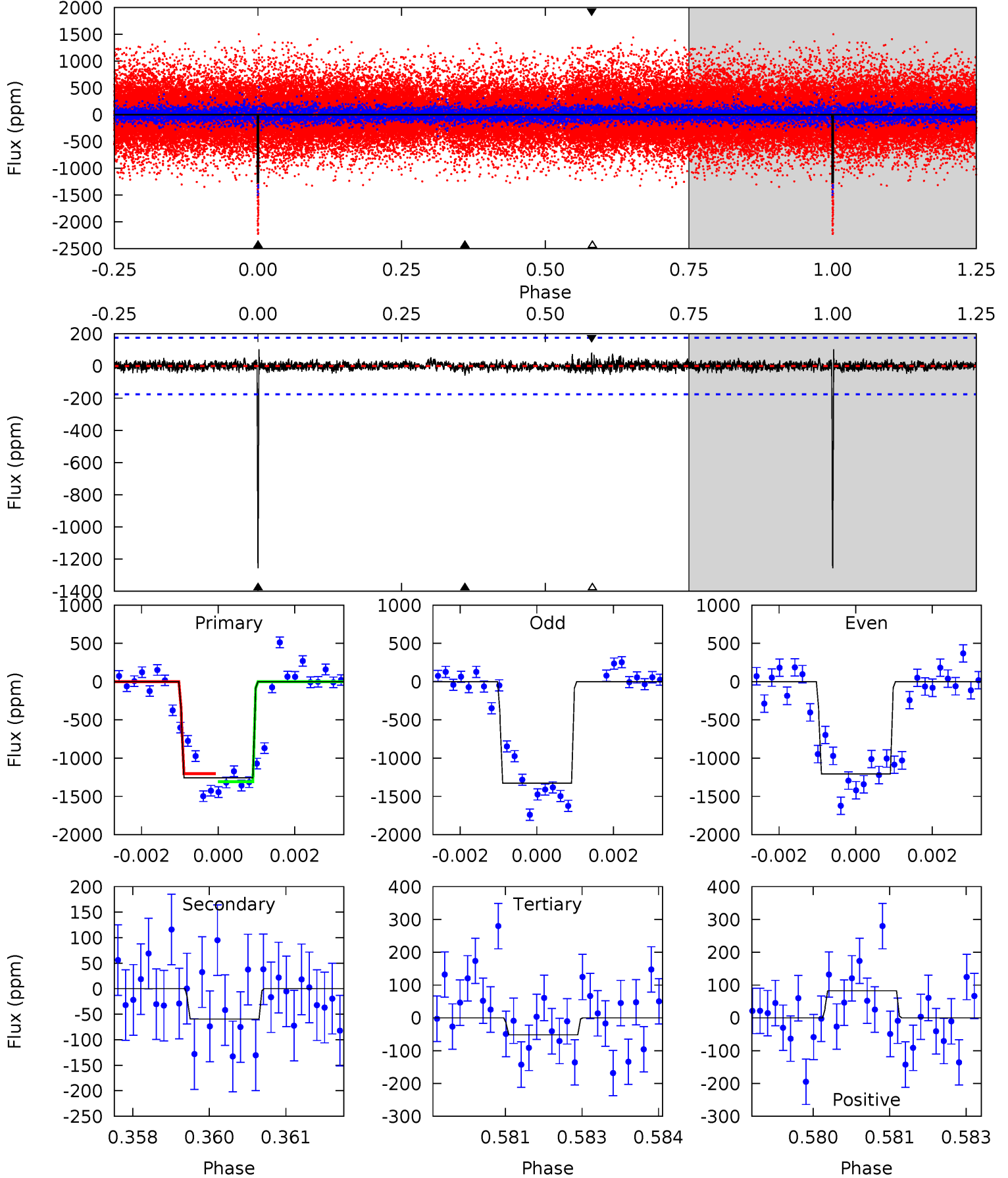
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.6	13.4	13.0	10.2	5.38	3.18	3.31	8.61	11.4	0.39	3.18	3.85	0.95	0.32	1.59



# Alt Model-Shift Uniqueness Test

006591775-01, P = 337.705446 Days, E = 289.095888 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.4	1.82	1.58	2.53	5.36	3.15	0.46	36.8	35.9	0.24	-0.70	1.81	1.00	0.08	0



### Stellar Parameters For KIC 006591775

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5415^{+177}_{-144}$	$4.496^{+0.110}_{-0.099}$	$-0.420^{+0.350}_{-0.300}$	$0.802^{+0.120}_{-0.109}$	$0.736^{+0.115}_{-0.046}$	$2.006^{+0.909}_{-0.629}$
	+3%/-3%	+2%/-2%	+83%/-71%	+15%/-14%	+16%/-6%	+45%/-31%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 006591775-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-736 \pm 55$	$2.55^{+1.06}_{-1.01}$	$323^{+17}_{-16}$	$5259^{+1494}_{-698}$	$47041^{+80011}_{-23735}$
Alt.	$-60 \pm 33$	$3.08^{+1.07}_{-1.07}$	$323^{+16}_{-15}$	$3130^{+505}_{-387}$	$2468^{+4152}_{-1520}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

## DV Centroid Data

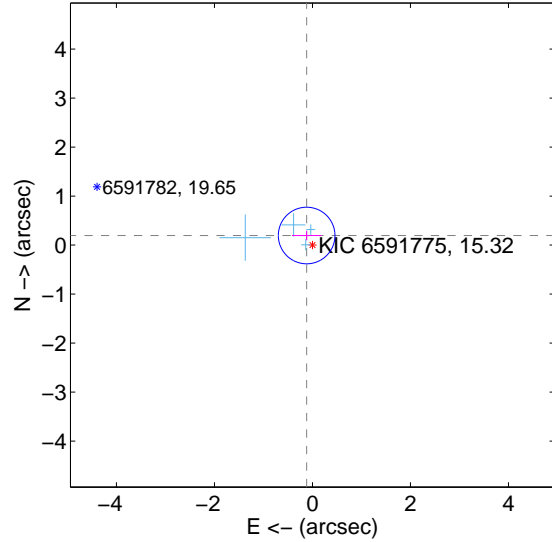
Supplemental centroid analysis for 006591775-01. Kepler magnitude: 15.32. Transit SNR 6.68

There are 4 quarters with good PRF difference image offsets

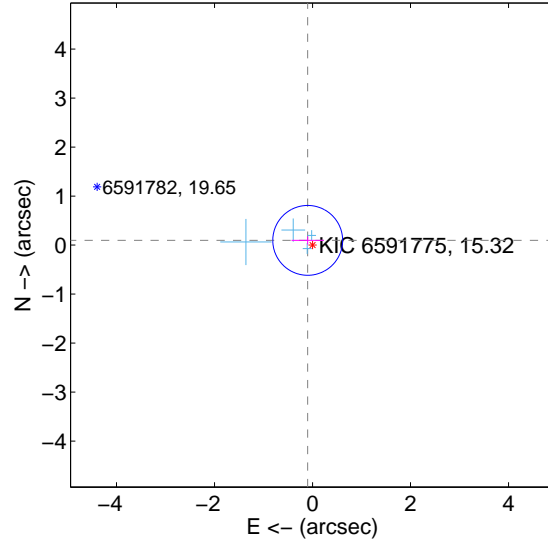
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.229 \pm 0.193$	1.19	$0.118 \pm 0.298$	$0.196 \pm 0.098$
PRF-fit source offset from KIC position	$0.138 \pm 0.238$	0.58	$0.098 \pm 0.330$	$0.097 \pm 0.083$
photometric centroid source offset	$1.23 \pm 0.96$	1.28	$0.75 \pm 0.96$	$-0.97 \pm 0.96$

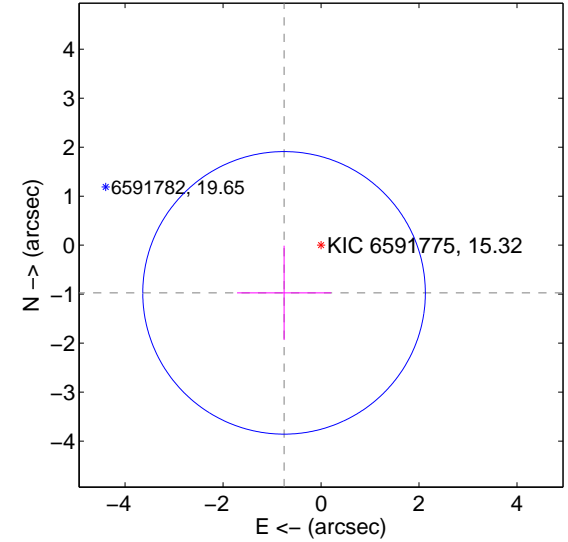
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

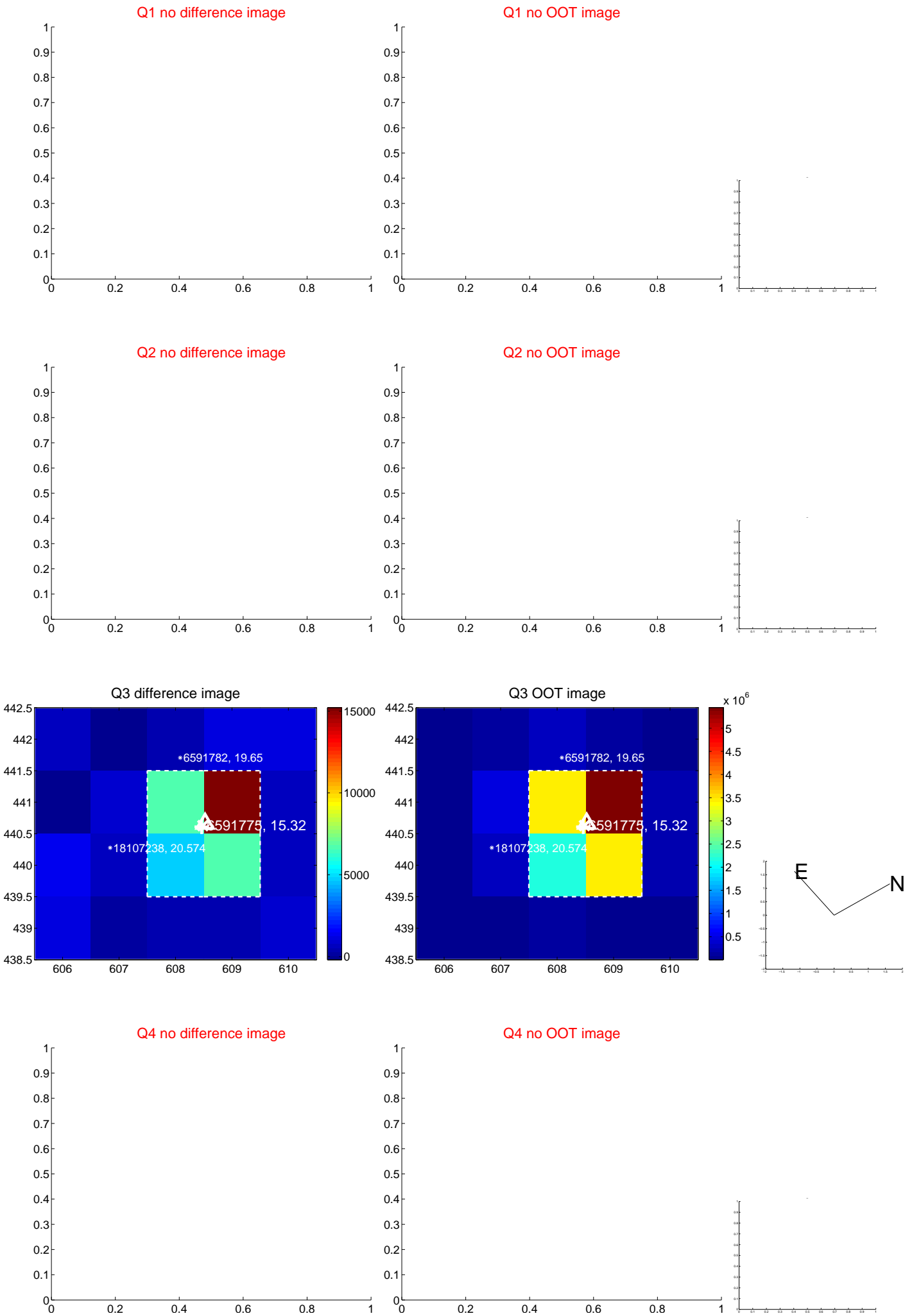


offset from photometric centroids

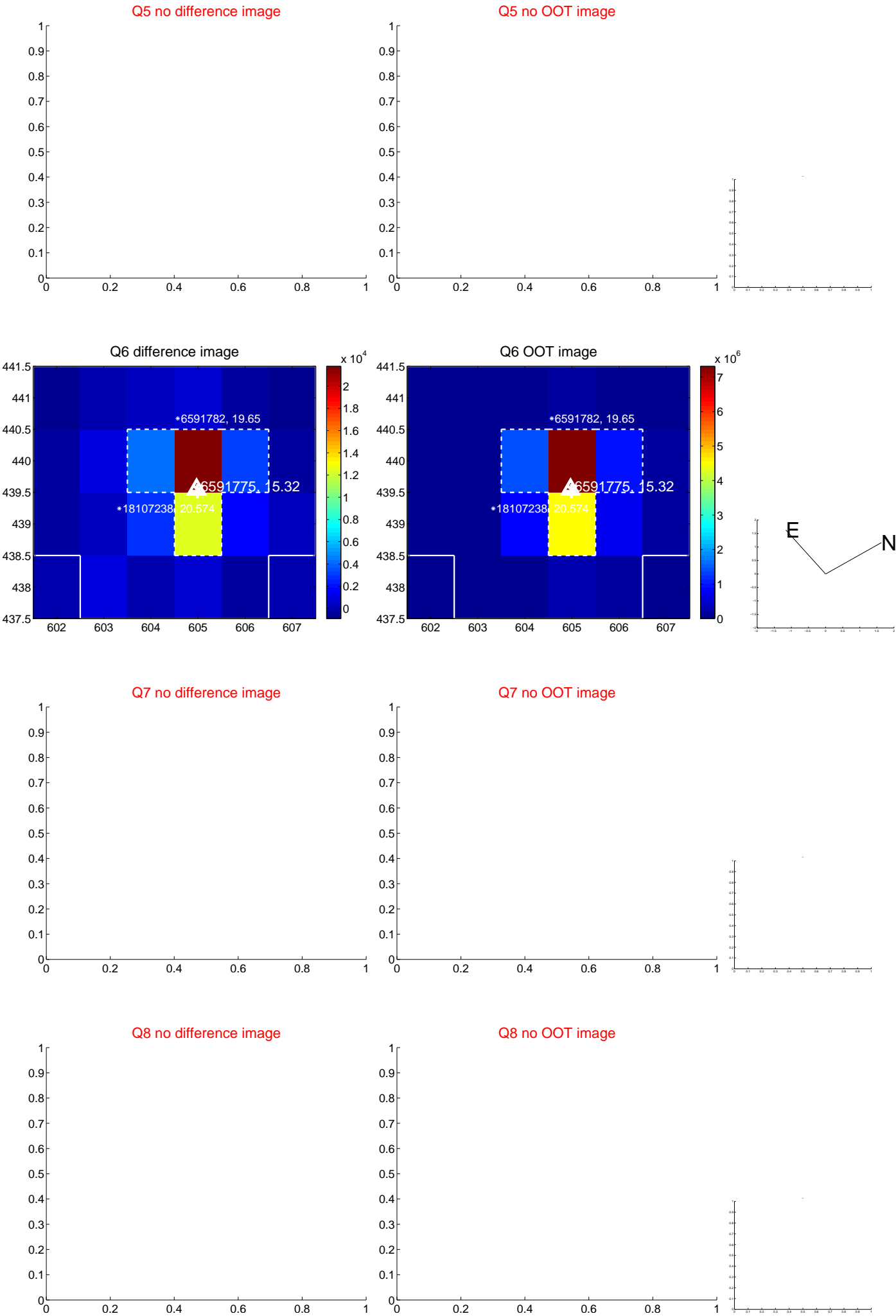


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

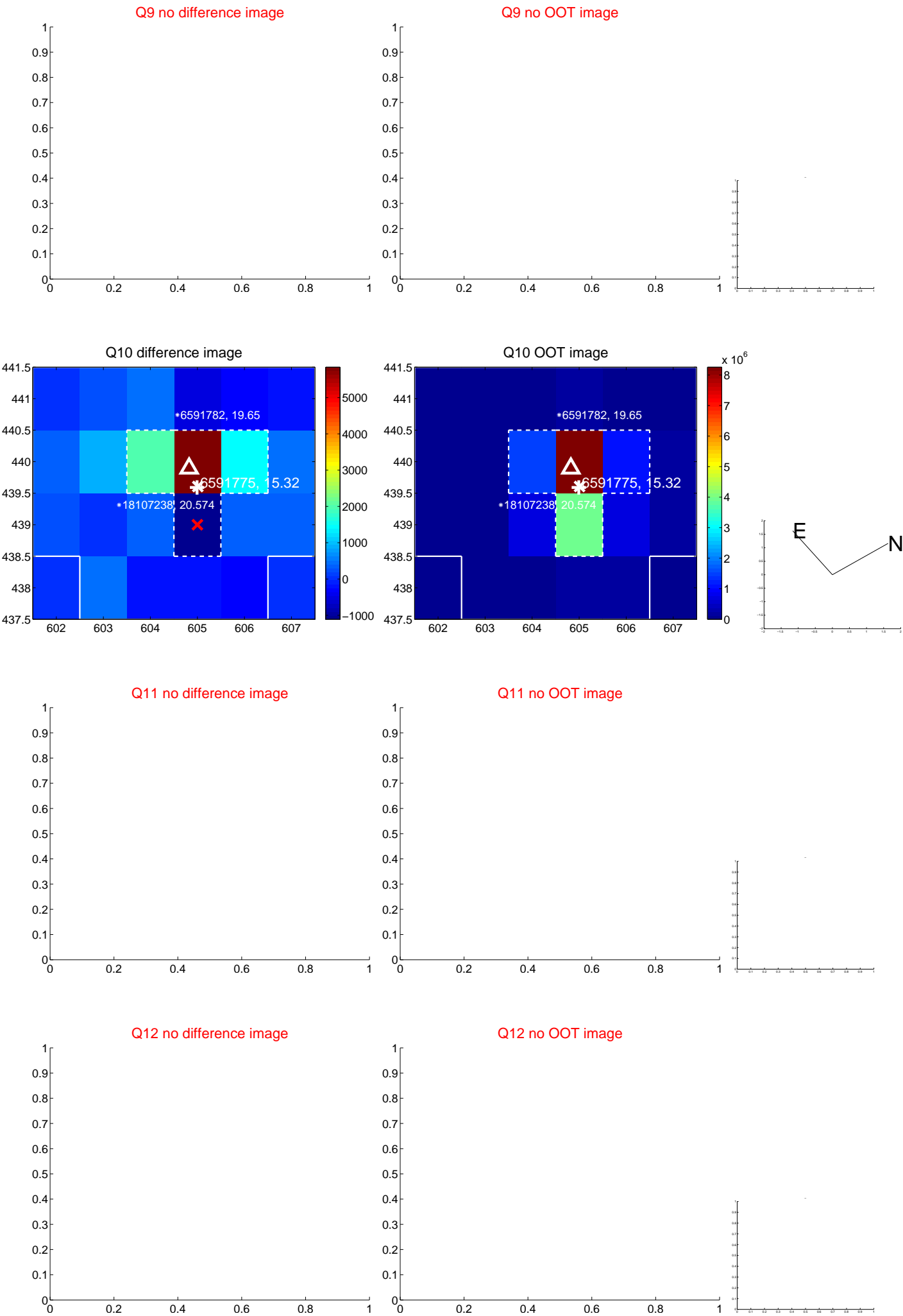


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



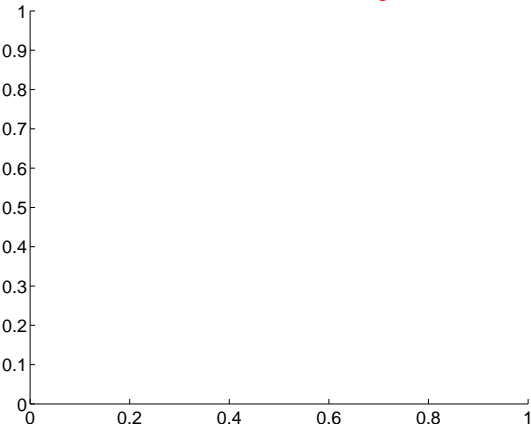


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

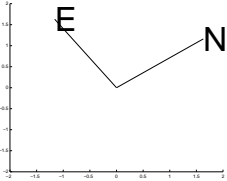
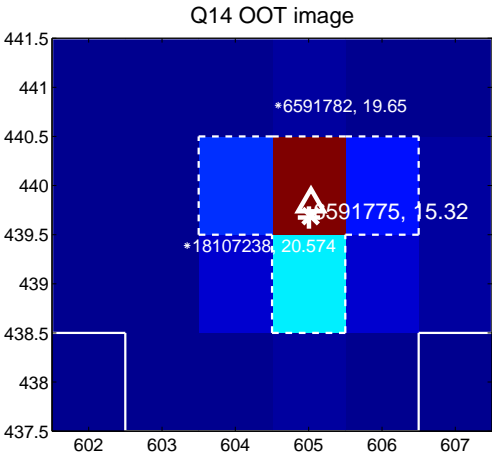
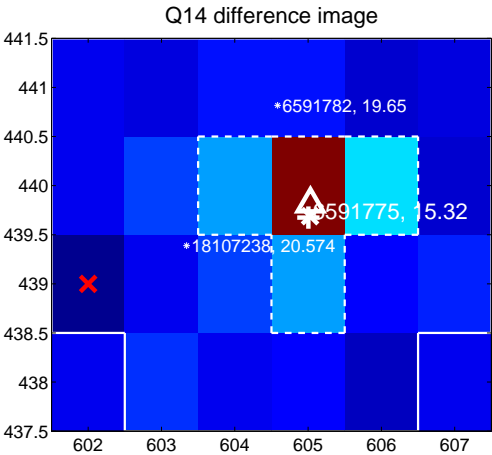
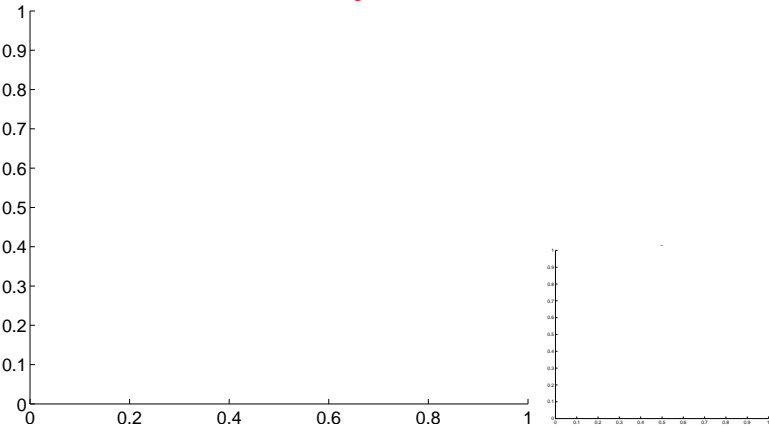


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

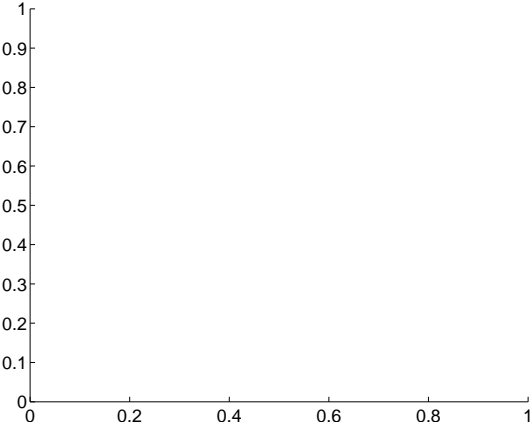
Q13 no difference image



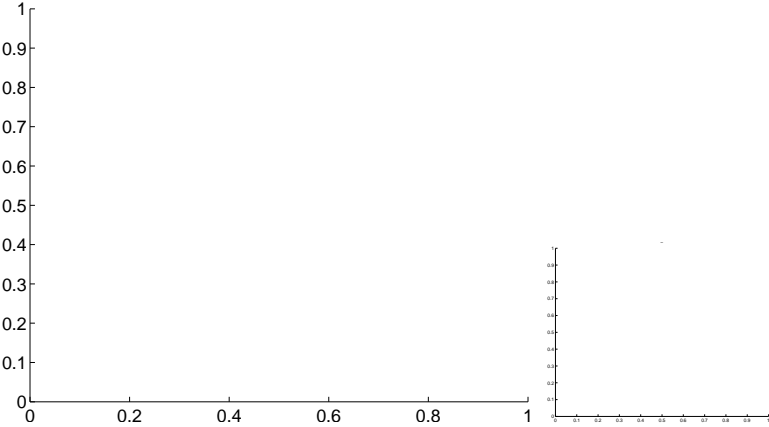
Q13 no OOT image



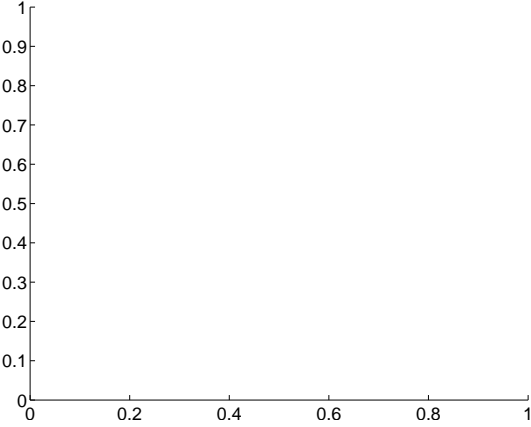
Q15 no difference image



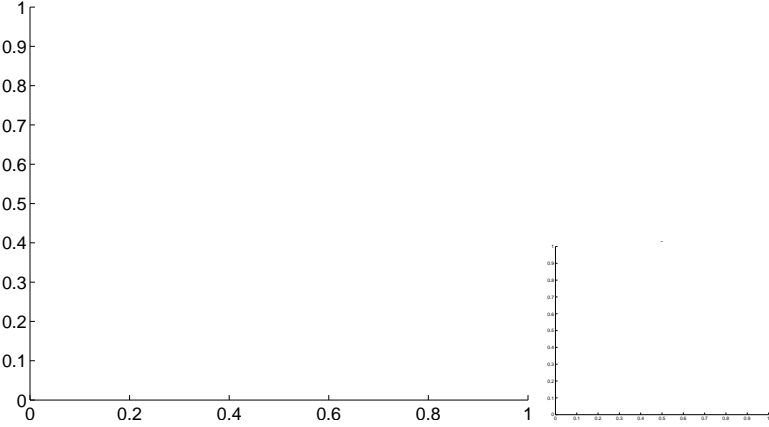
Q15 no OOT image



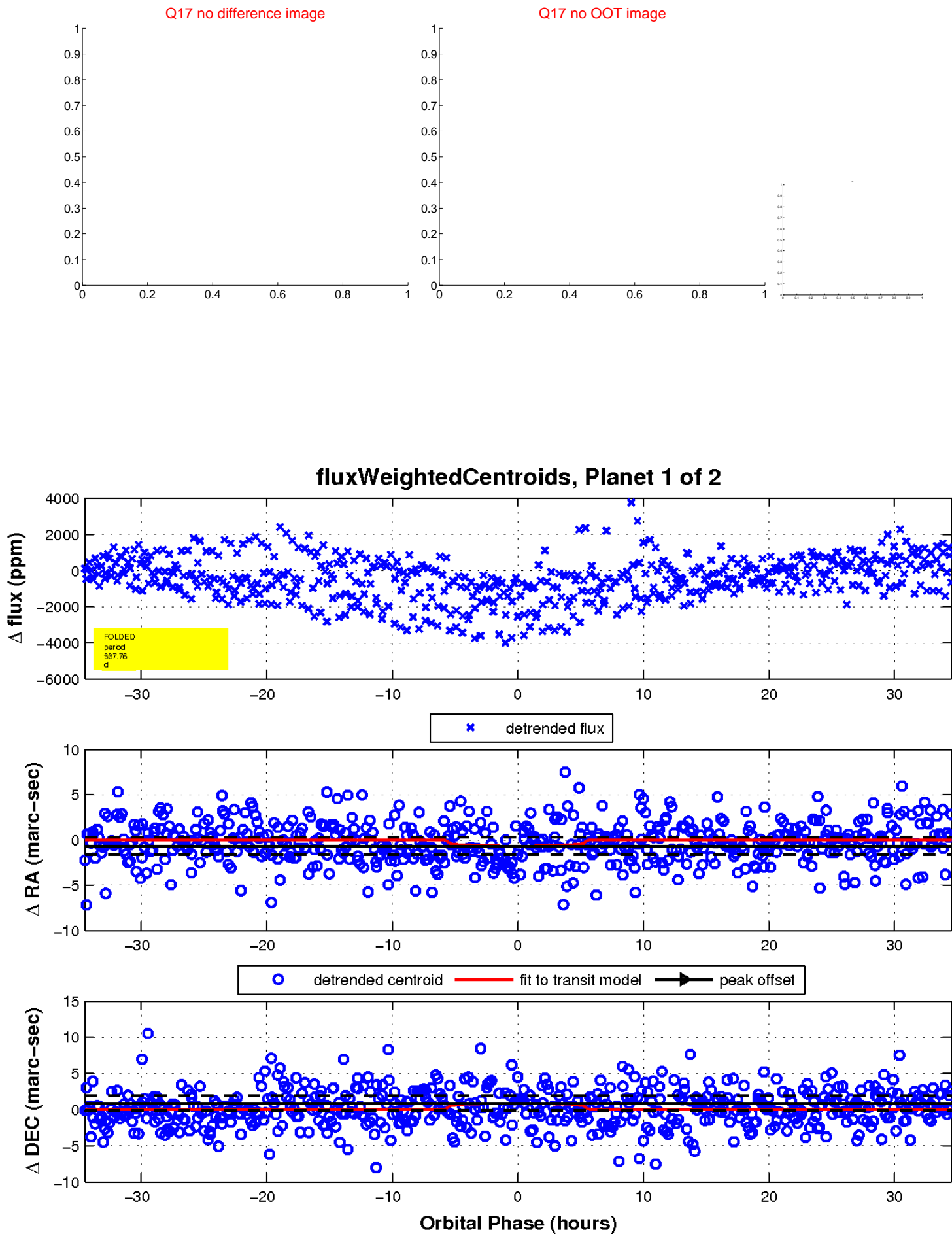
Q16 no difference image



Q16 no OOT image

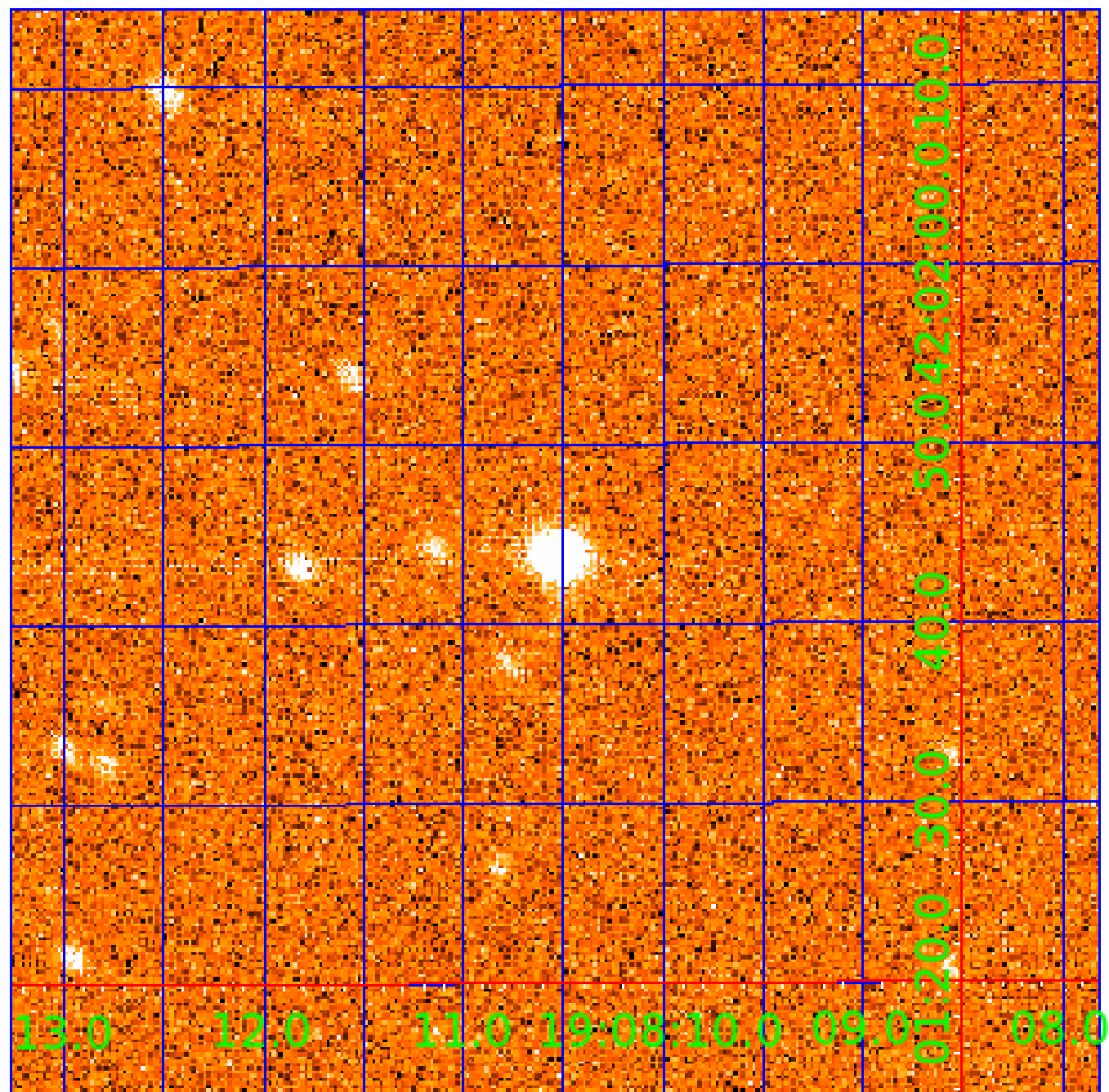


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 006591775

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006591775-01	OBS	No	337.761849	289.009338	911.5	11.527	13.3	6.7	0.80	5415	2.50	0.68
006591775-02	OBS	No	583.869722	406.311297	932.9	10.733	12.0	6.8	0.80	5415	2.52	0.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006591775-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
006591775-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

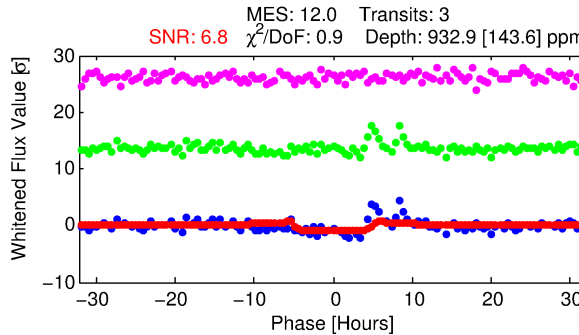
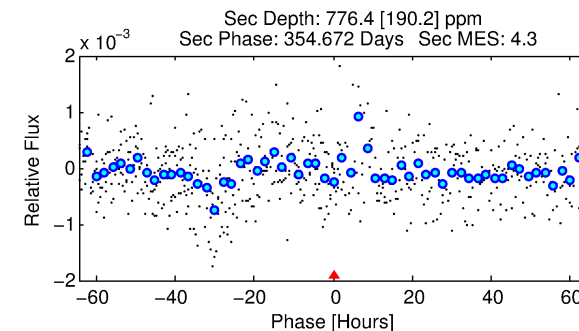
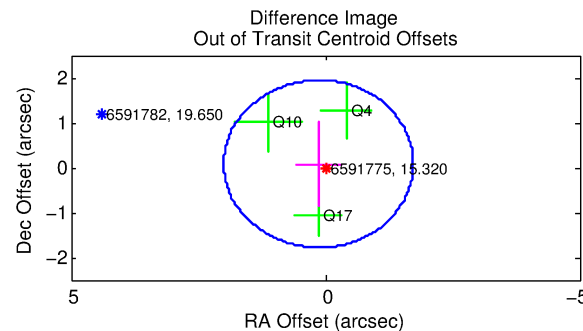
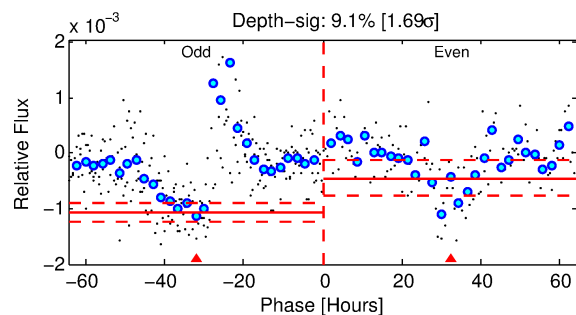
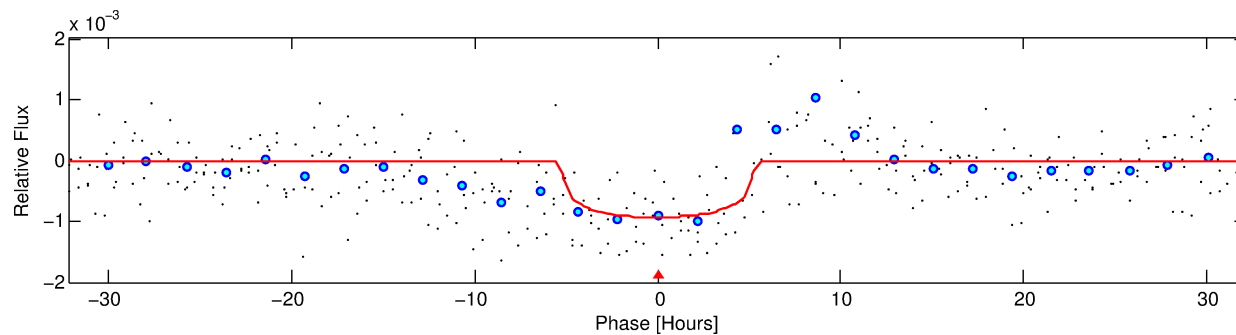
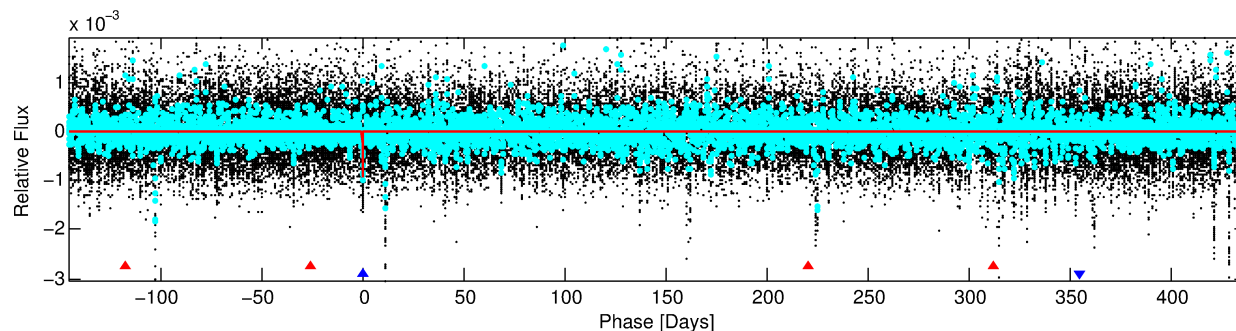
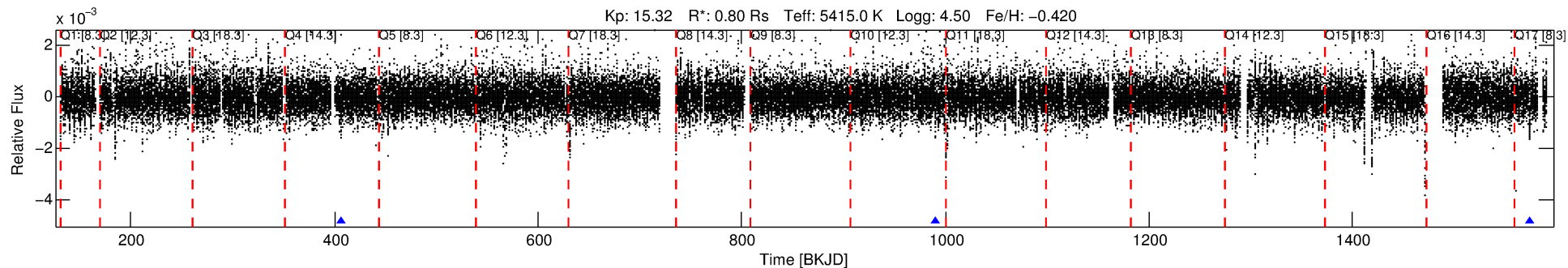
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006591775-02

No Significant Match Found

# DV One-Page Summary

KIC: 6591775 Candidate: 2 of 2 Period: 583.870 d



## DV Fit Results:

Period = 583.86972 [0.00852] d  
Epoch = 406.3113 [0.0124] BKJD  
Rp/R\* = 0.0288 [0.0477]  
a/R\* = 361.00 [2505.88]  
b = 0.55 [8.86]  
Seff = 0.33 [0.08]  
Teq = 193 [11] K  
Rp = 2.52 [4.19] Re  
a = 1.2341 [0.1613] AU  
Ag = 102552.67 [341538.33] [0.30 $\sigma$ ]  
Teffp = 5328 [4432] K [1.16 $\sigma$ ]

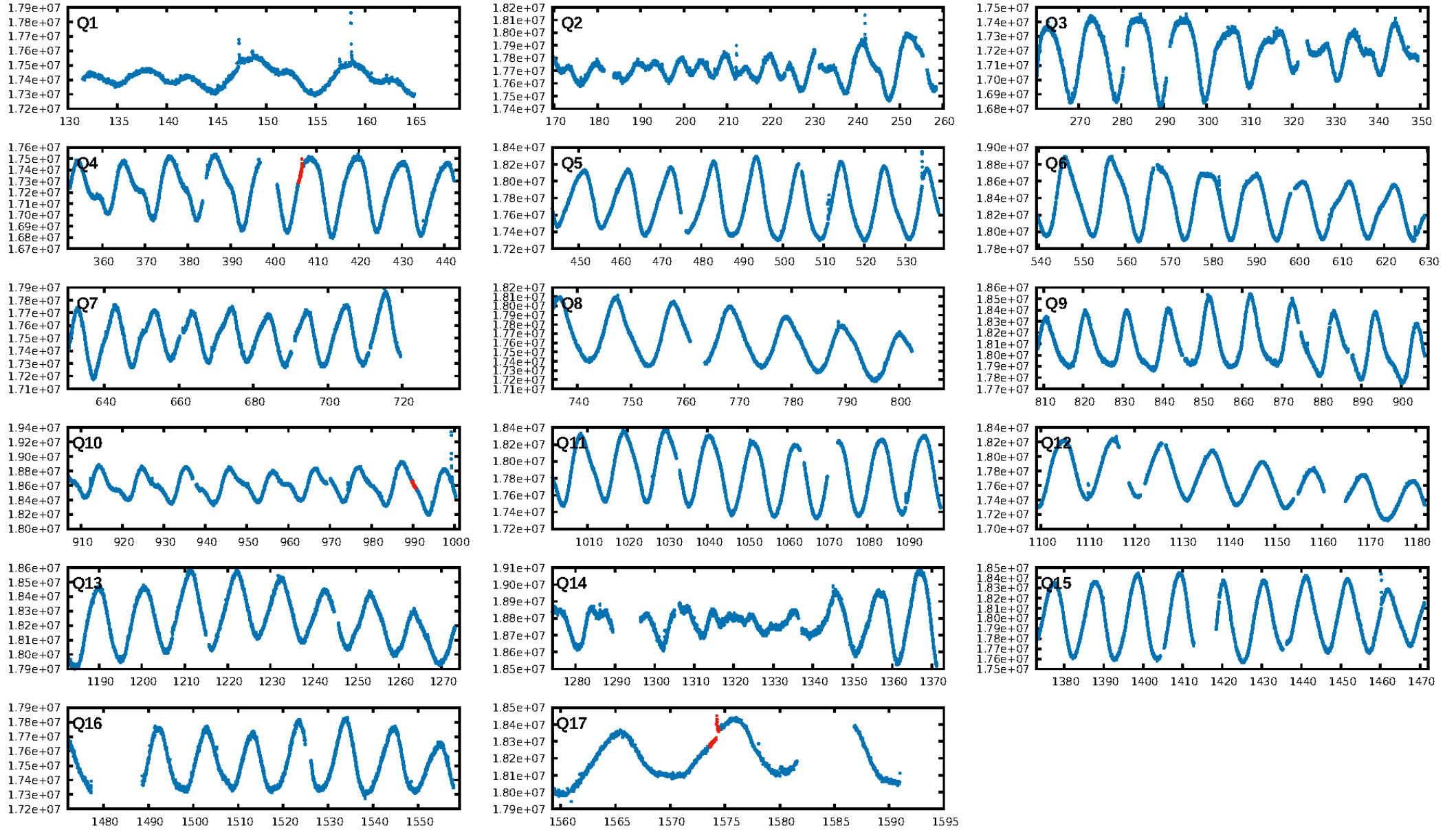
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [375.02 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.1%  
ModelChiSquareGof-sig: 93.6%  
Bootstrap-pfa: 5.23e-14  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 1.112  
Centroid-sig: 2.2%  
Centroid-so: 1.567 arcsec [1.49 $\sigma$ ]  
OotOffset-rm: 0.160 arcsec [0.26 $\sigma$ ]  
KicOffset-rm: 0.122 arcsec [0.26 $\sigma$ ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
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DiffImageOverlap-fno: 1.00 [3/3]

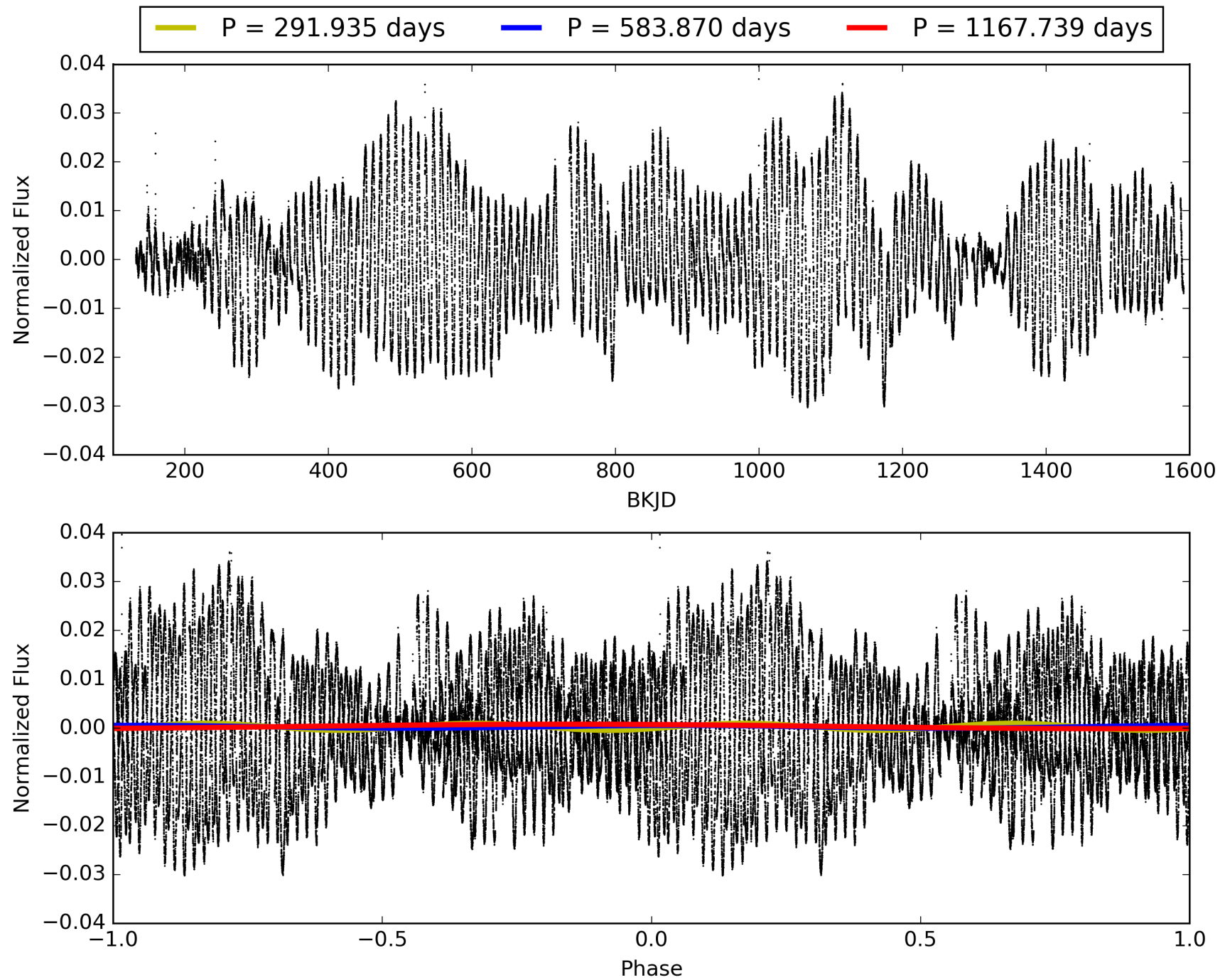
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:53:11 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006591775-02, PDC Light Curves



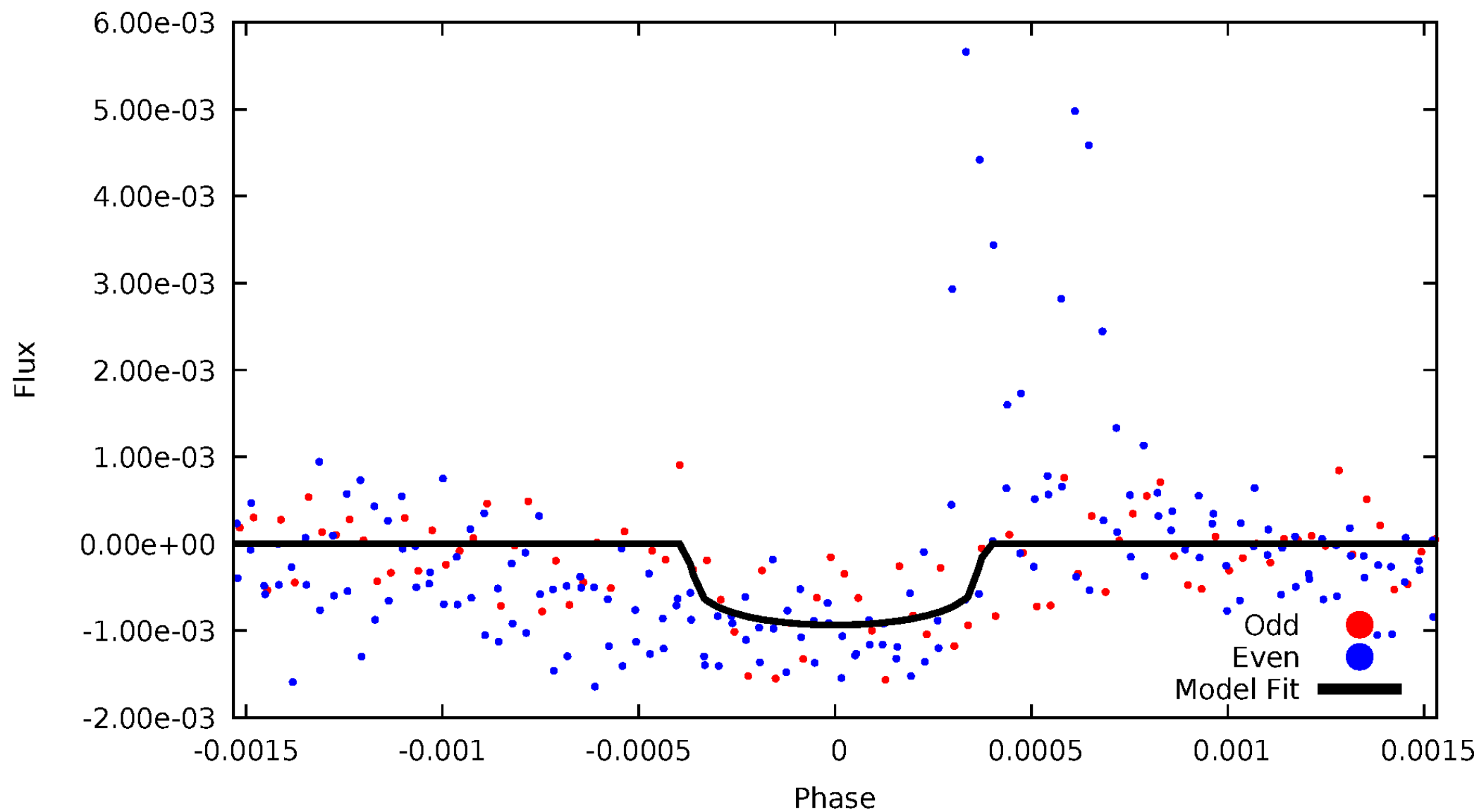
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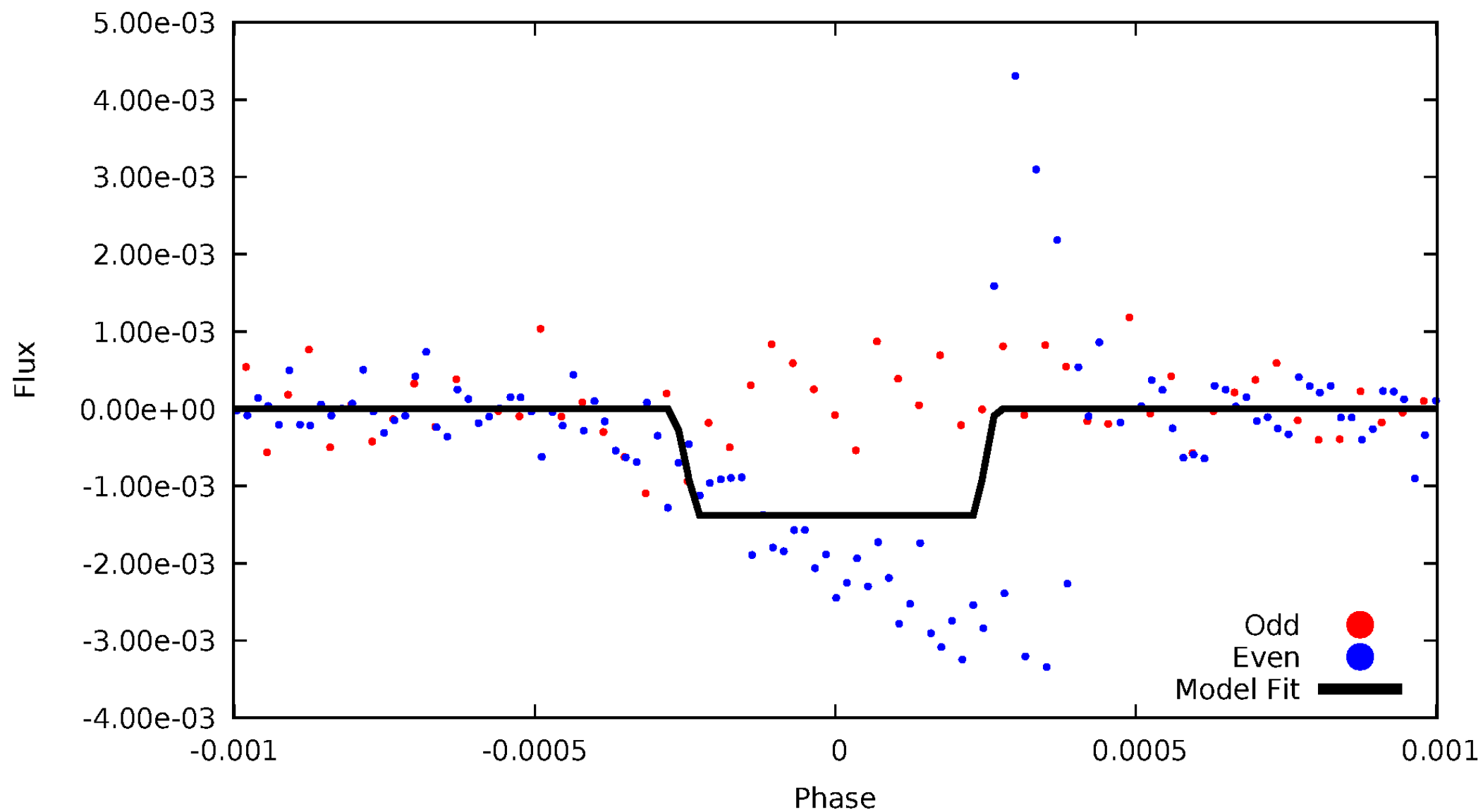
# DV Odd/Even

TCE 006591775-02



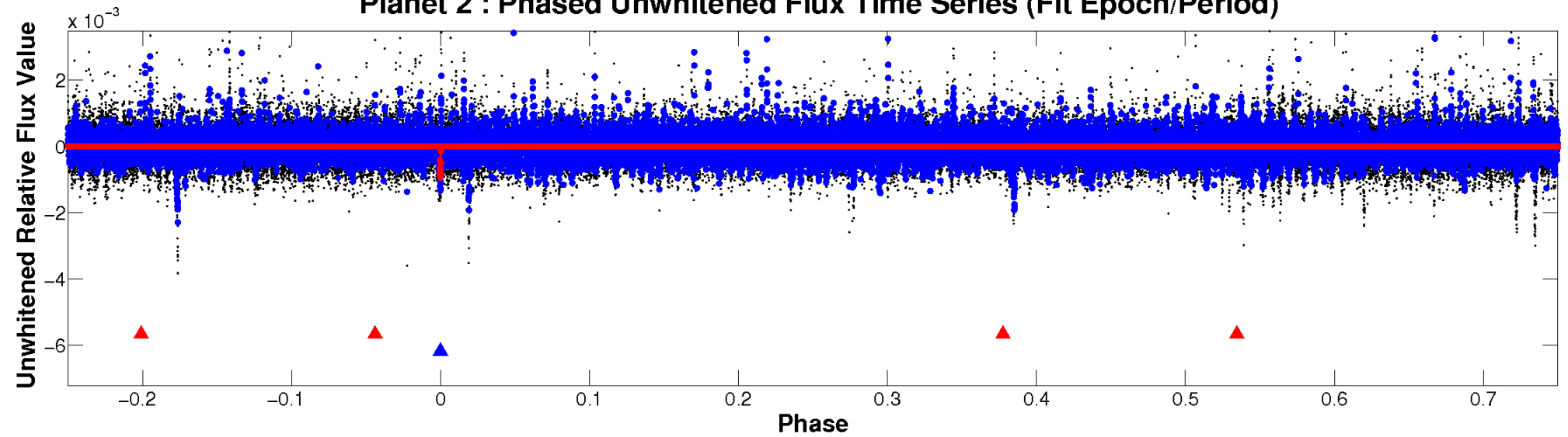
# ALT Odd/Even

TCE 006591775-02

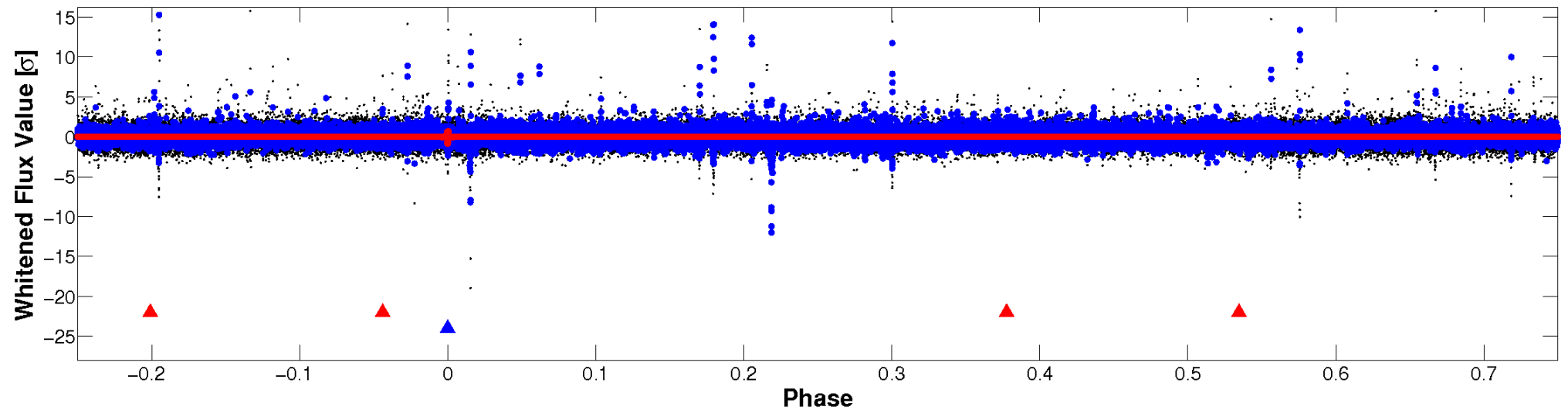


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

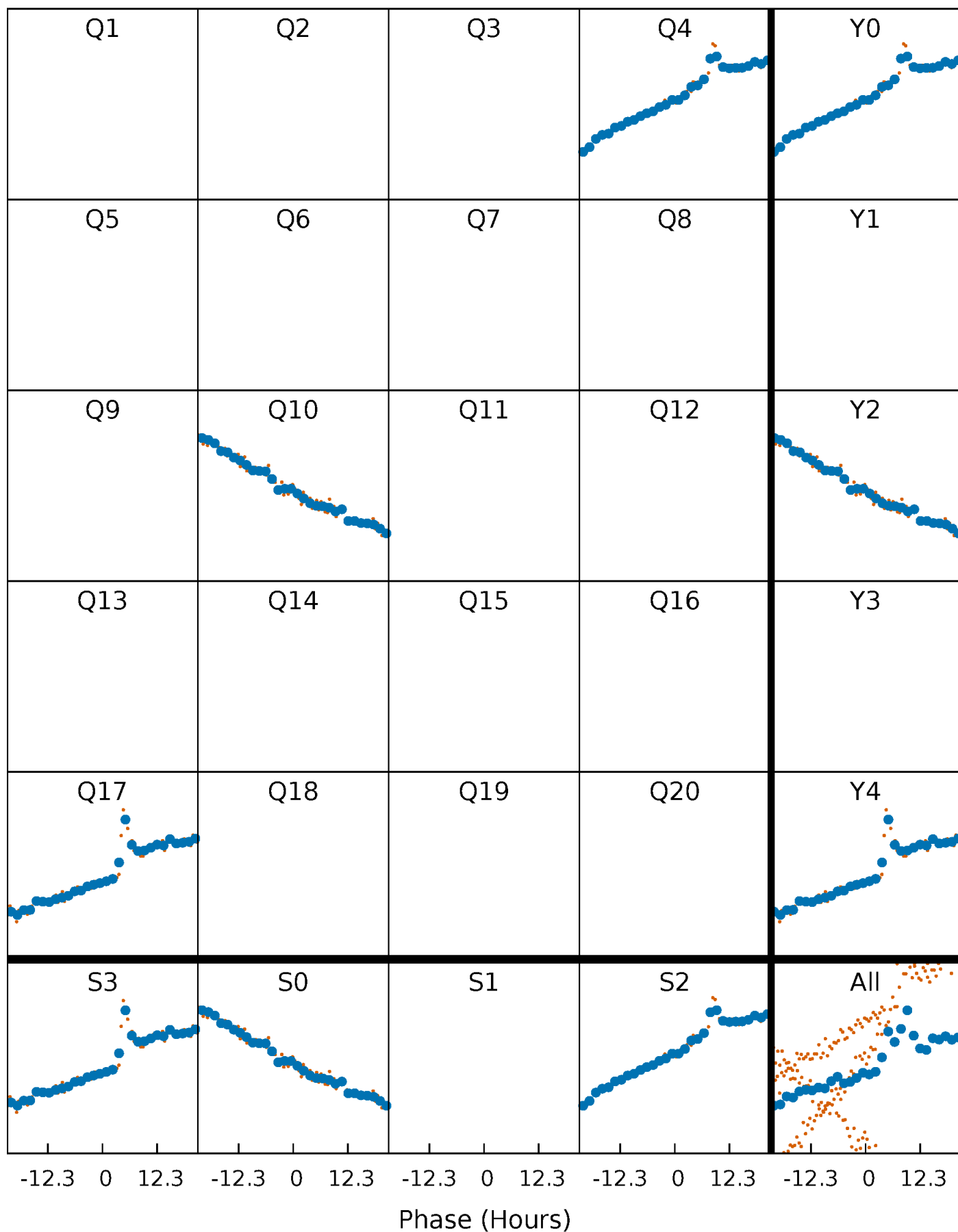


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



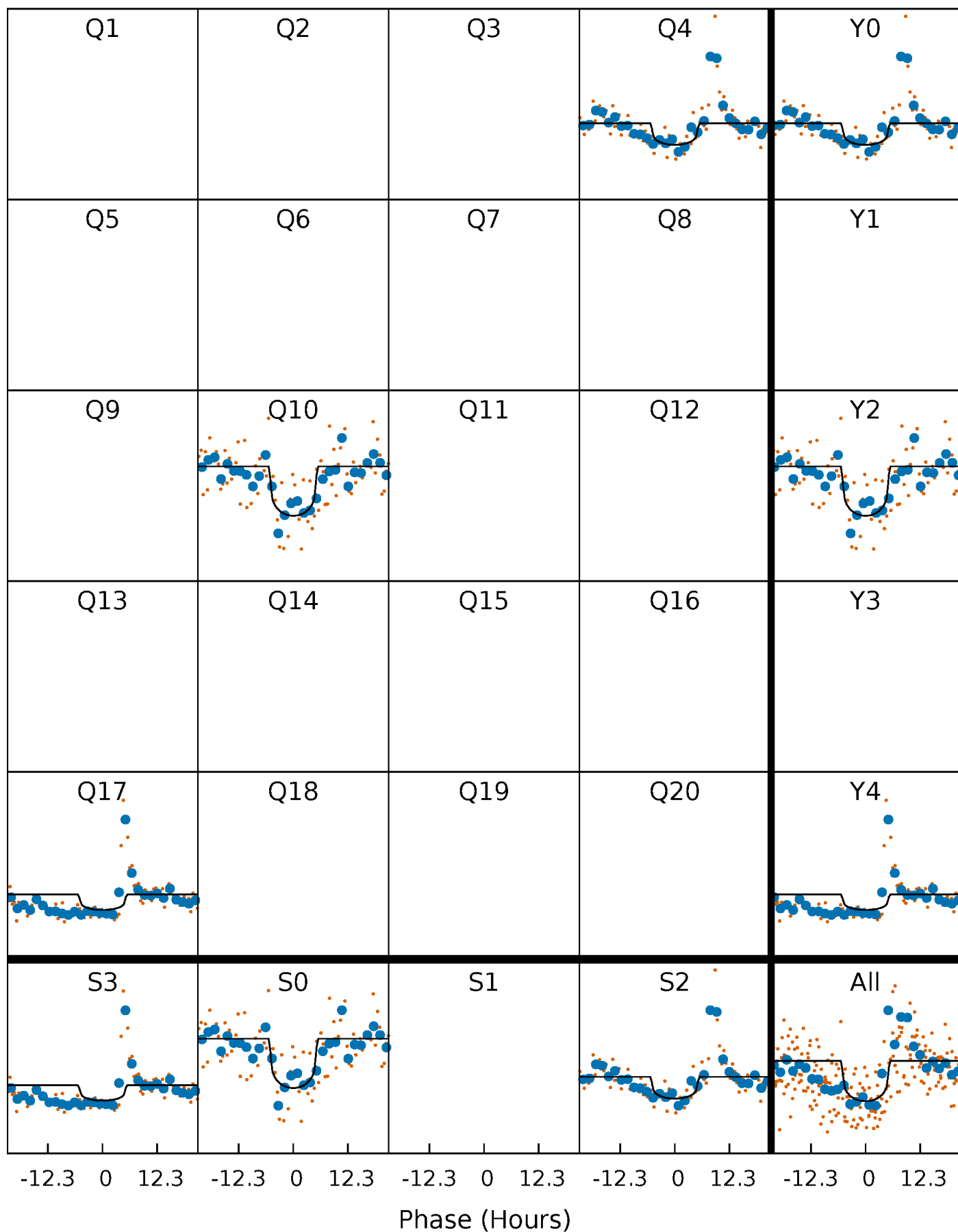
# PDC Quarter-Phased Transit Curves

TCE 006591775-02 P=583.869722 Days  $T_0=406.311297$  (BKJD)



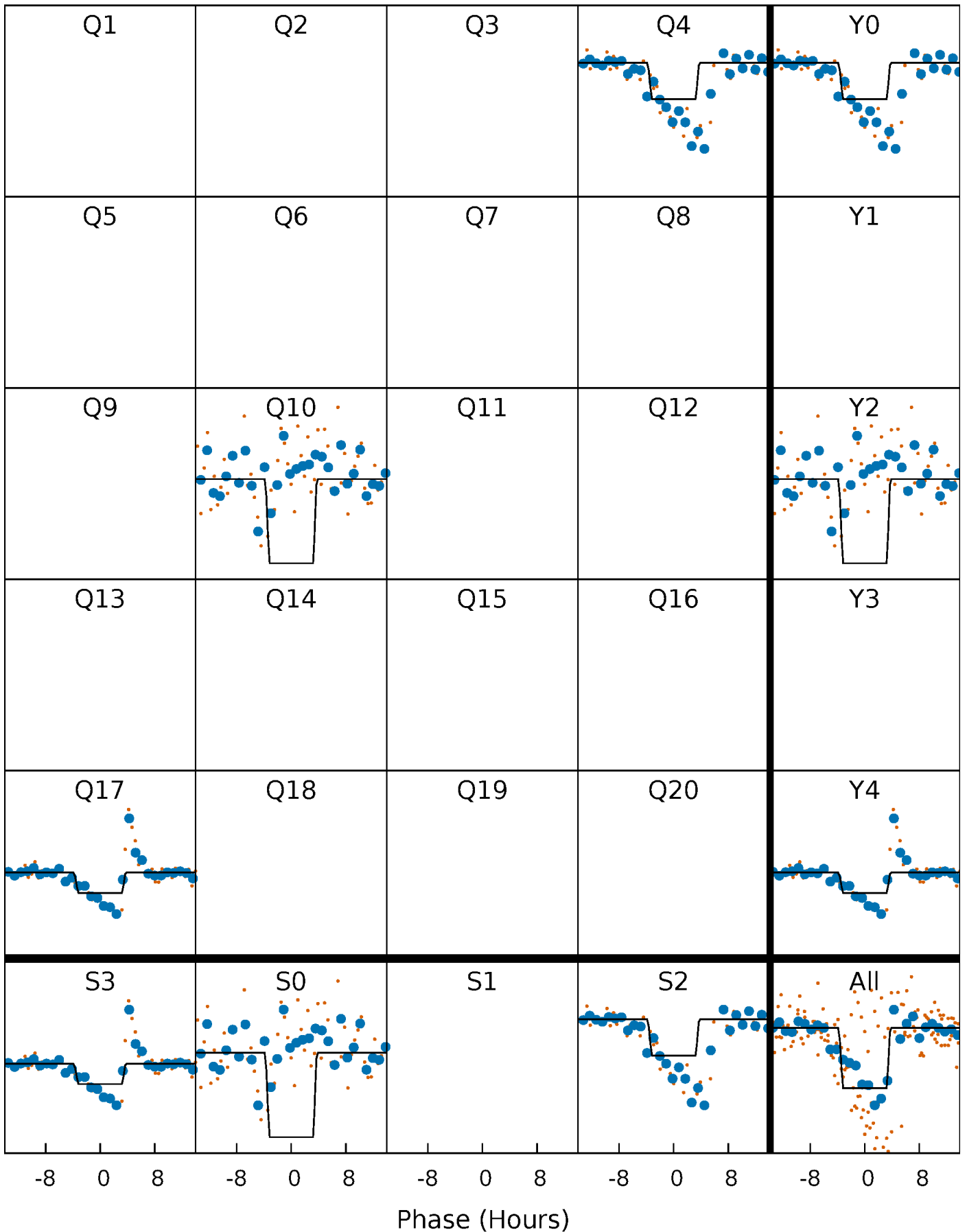
# DV Quarter-Phased Transit Curves

TCE 006591775-02     $P=583.869722$  Days     $T_0=406.311297$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

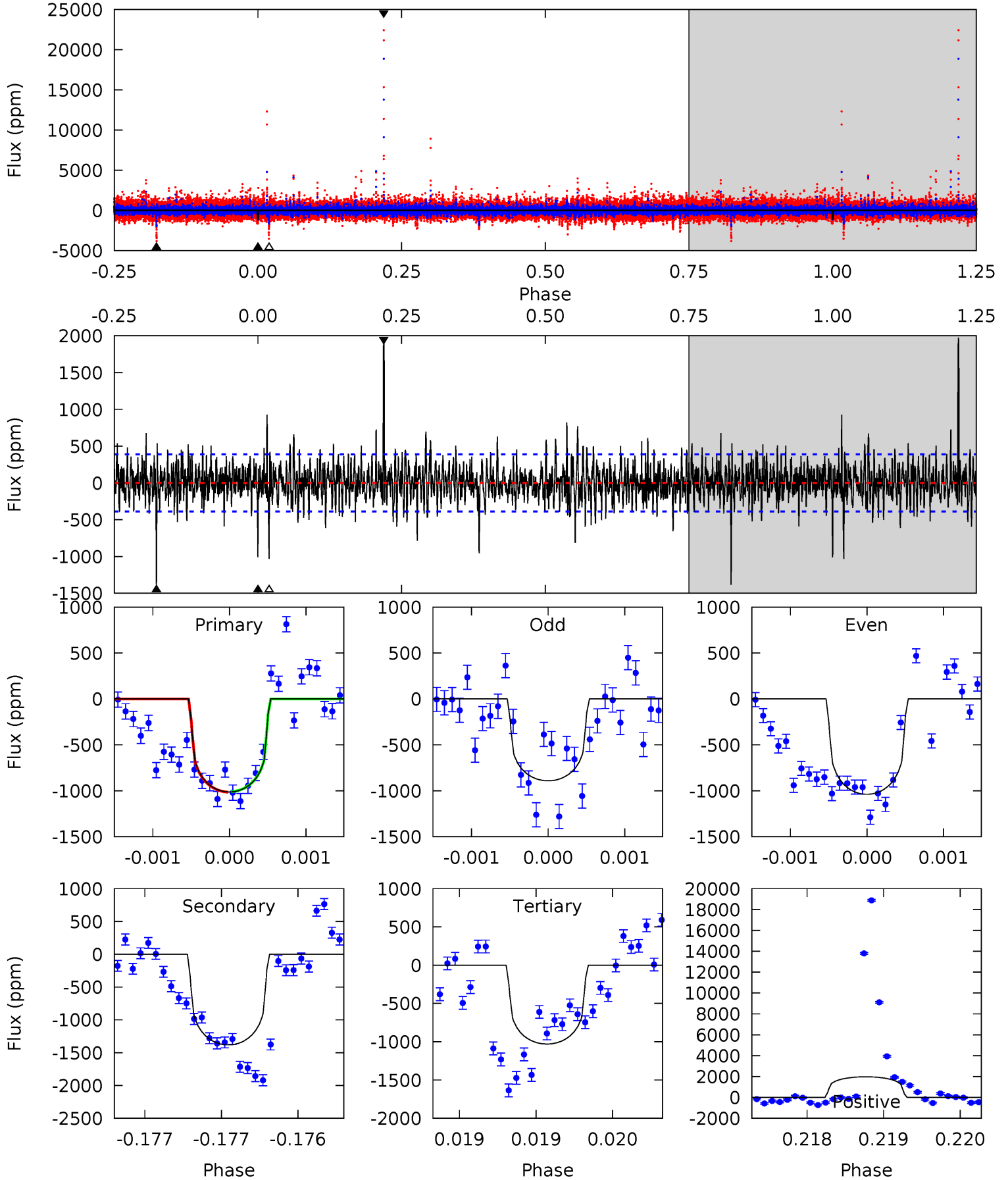
TCE 006591775-02 P=583.834488 Days  $T_0=406.401745$  (BKJD)



# DV Model-Shift Uniqueness Test

006591775-02, P = 583.869722 Days, E = 406.311297 Days

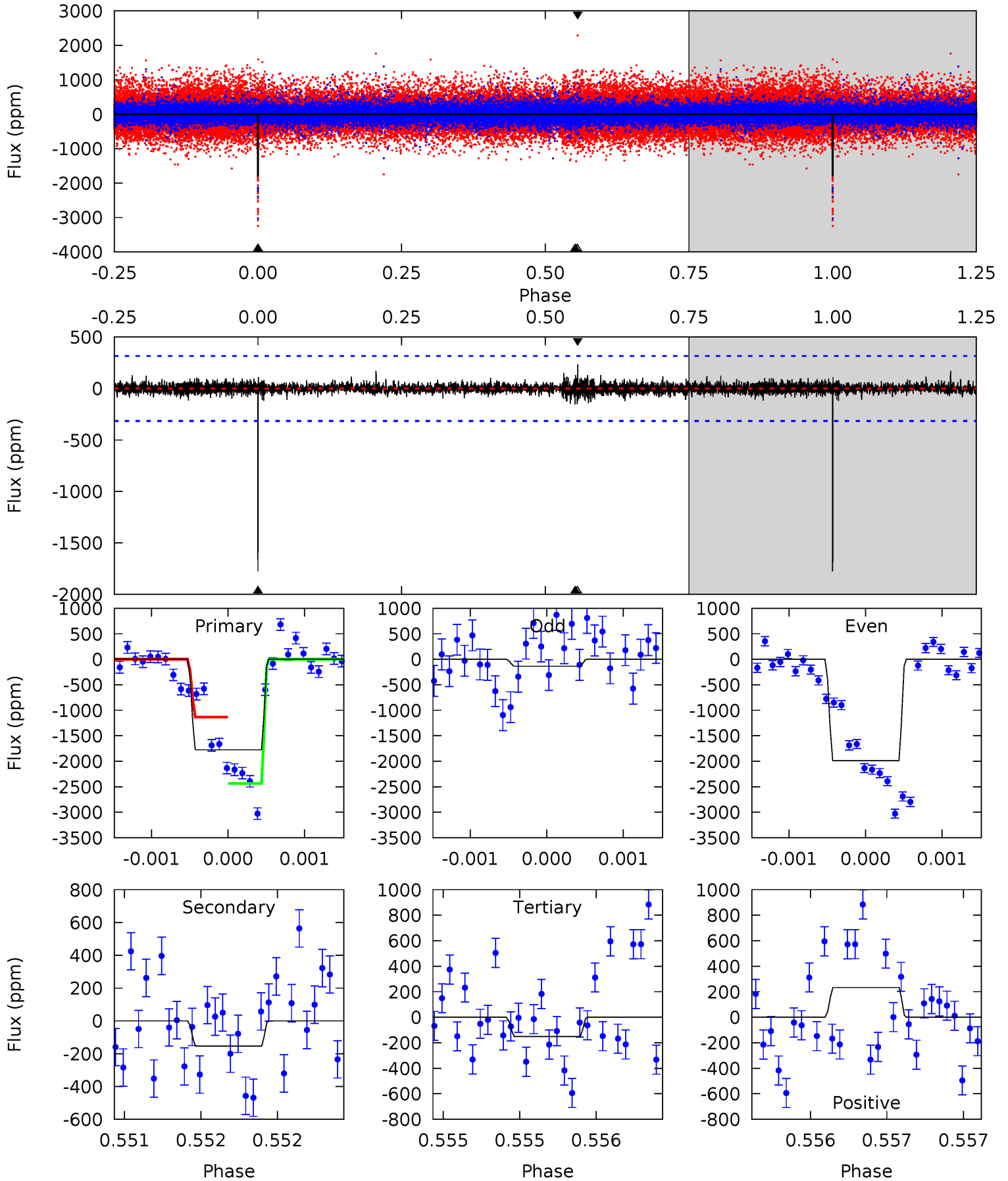
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.4	19.6	14.6	28.0	5.50	3.37	2.95	-0.25	-13.6	4.98	-8.40	0.90	0.95	0.59	0.04



# Alt Model-Shift Uniqueness Test

006591775-02, P = 583.834488 Days, E = 406.401745 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.4	2.72	2.66	4.11	5.56	3.47	0.50	28.7	27.3	0.06	-1.39	17.5	0.66	0.12	11.7





### Stellar Parameters For KIC 006591775

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5415^{+177}_{-144}$	$4.496^{+0.110}_{-0.099}$	$-0.420^{+0.350}_{-0.300}$	$0.802^{+0.120}_{-0.109}$	$0.736^{+0.115}_{-0.046}$	$2.006^{+0.909}_{-0.629}$
	+3%/-3%	+2%/-2%	+83%/-71%	+15%/-14%	+16%/-6%	+45%/-31%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 006591775-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1382 \pm 71$	$3.96^{+3.44}_{-2.63}$	$270^{+14}_{-13}$	$5001^{+3929}_{-1048}$	$75224^{+604554}_{-53401}$
Alt.	$-154 \pm 57$	$4.41^{+3.79}_{-2.84}$	$269^{+13}_{-13}$	$3222^{+1464}_{-511}$	$6735^{+45324}_{-4920}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

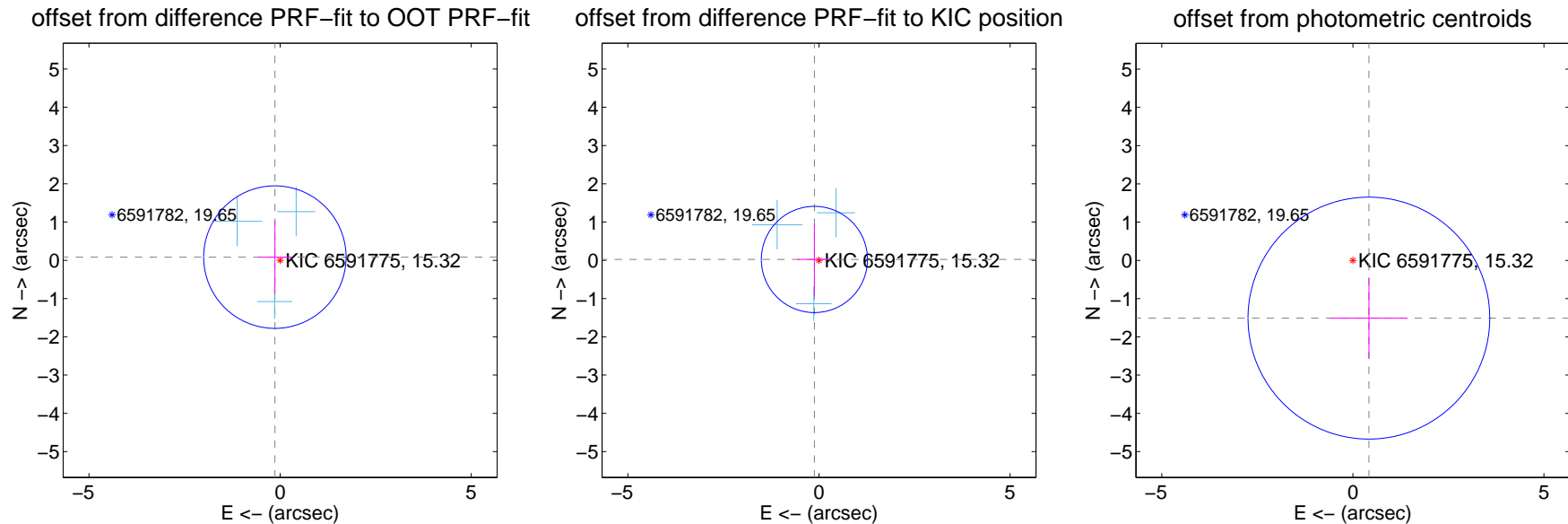
## DV Centroid Data

Supplemental centroid analysis for 006591775-02. Kepler magnitude: 15.32. Transit SNR 6.79

There are 3 quarters with good PRF difference image offsets

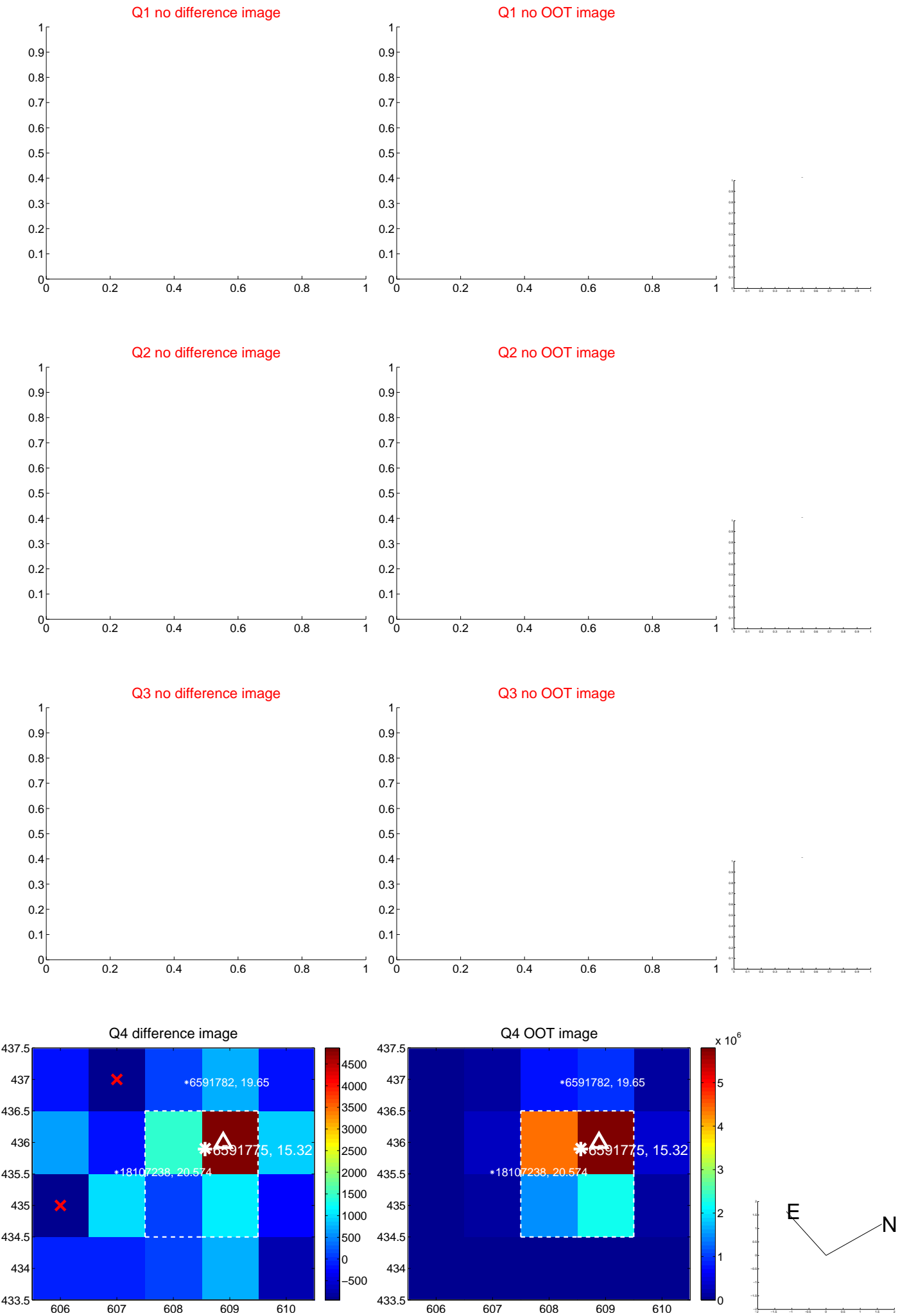
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.160 \pm 0.621$	0.26	$0.137 \pm 0.439$	$0.083 \pm 0.952$
PRF-fit source offset from KIC position	$0.122 \pm 0.463$	0.26	$0.120 \pm 0.437$	$0.022 \pm 0.943$
photometric centroid source offset	$1.57 \pm 1.05$	1.49	$-0.42 \pm 1.01$	$-1.51 \pm 1.06$



Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

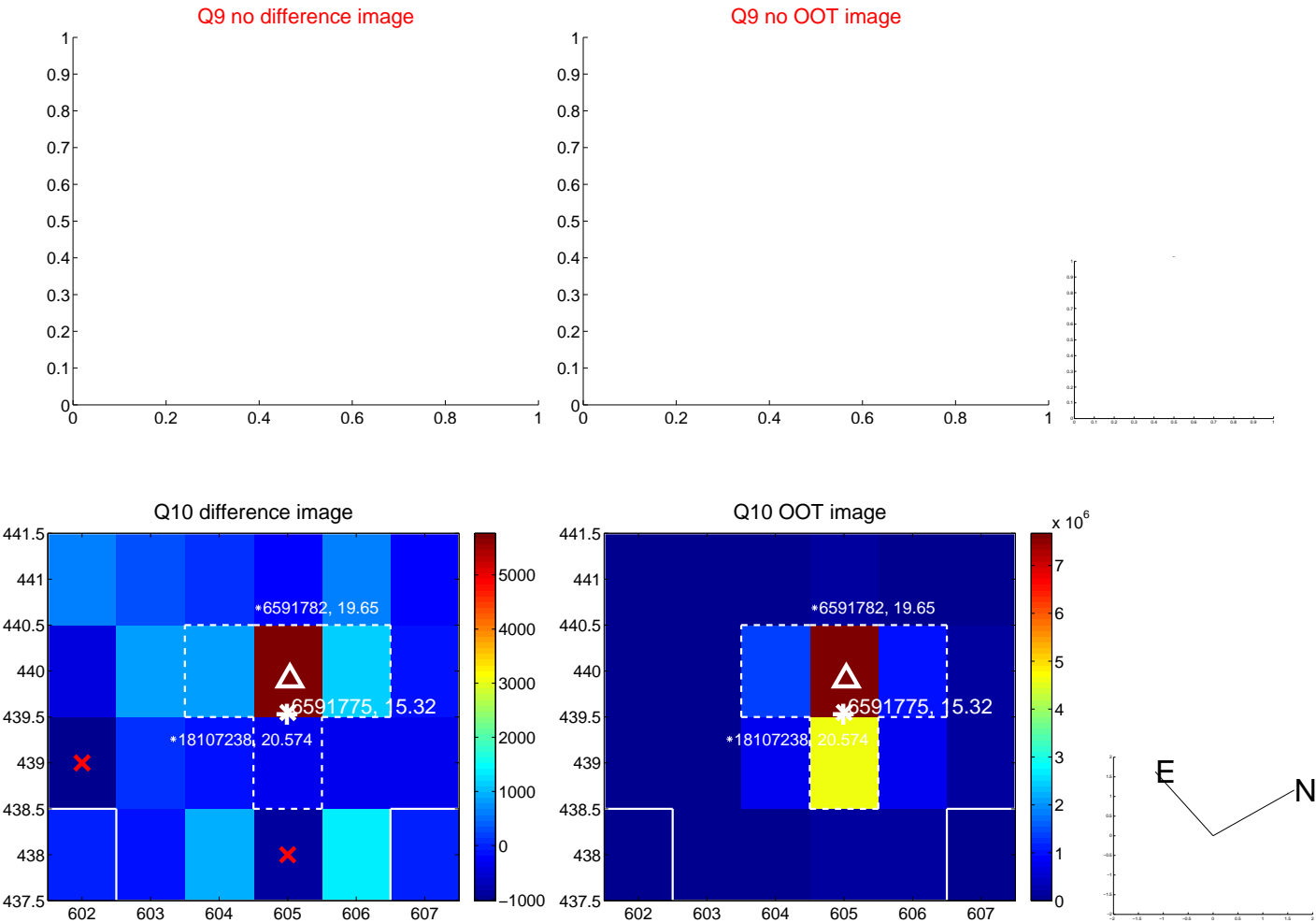
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



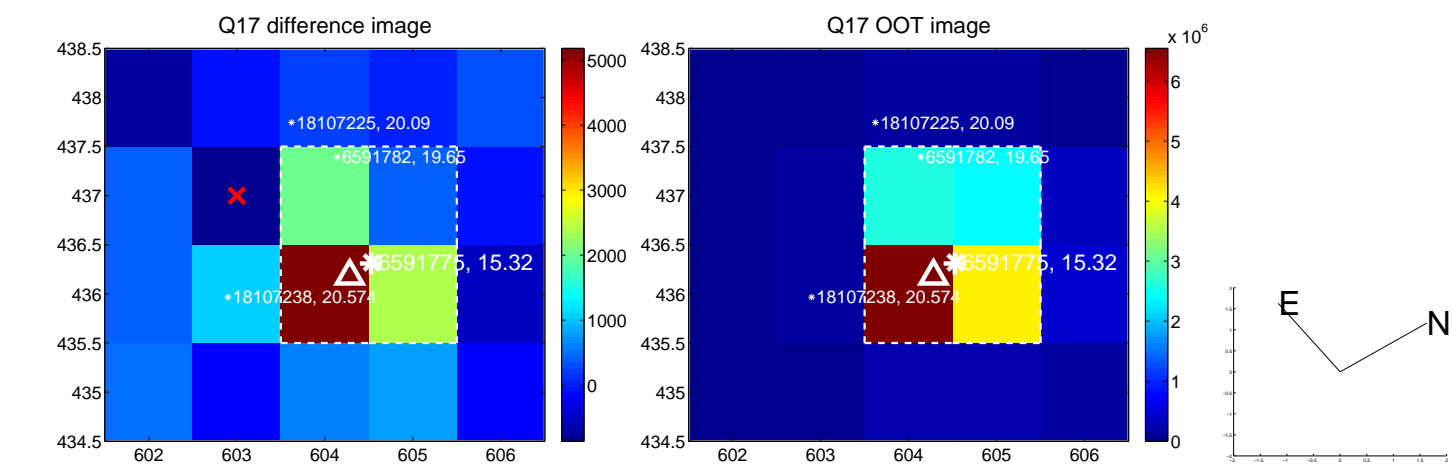
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



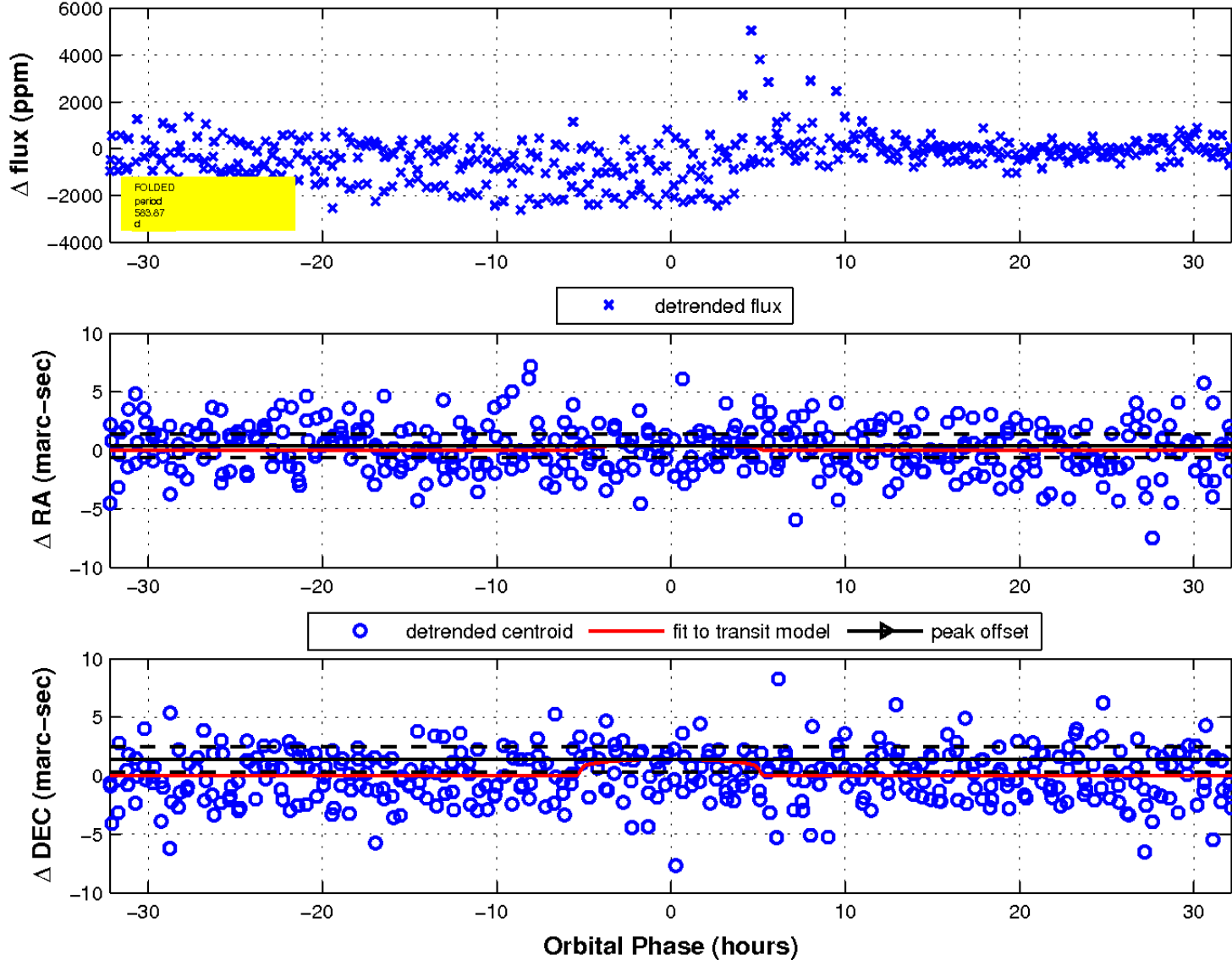
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



# UKIRT Image

Declination

